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ANNUAL REPORT

OF THE

Department of Agriculture

OF THE

PROVINCE OF ONTARIO

1906

VOL I.

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
Printed by L. K. CAMERON, Printer to the King's Most Excellent Majesty
1907

WARWICK BRO'S & RUTTER, Limited, Printers
TORONTO.

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THIRTY-SECOND ANNUAL REPORT

OF THE

Ontario Agricultural College

AND

Experimental Farm

1906

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO
Printed by L. K. CAMERON, Printer to the King's Most Excellent Majesty
1907

WARWICK BRO'S & RUTTER, Limited, Printers,
TORONTO.

1—A.C.

To the Honourable WILLIAM MORTIMER CLARK, K.C.,
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the pleasure to present herewith for the consideration of your Honour the Report of the Ontario Agricultural College for 1906.

Respectfully submitted,

NELSON MONTEITH,
Minister of Agriculture.

TORONTO, 1907.

313753

The Ontario Agricultural College

AND

Experimental Farm, Guelph, Ont.

HON. NELSON MONTEITH, Minister of Agriculture, Toronto, Ont.

STAFF OF PROFESSORS, LECTURERS AND DEMONSTRATORS.

1907.

G. C. Creelman, B.S.A., M.S.	President.
H. H. Dean, B.S.A.	Professor of Dairy Husbandry.
C. A. Zavitz, B.S.A.	Professor of Field Husbandry and Experimentalist.
J. Hugo Reed, V.S.	Professor of Veterinary Science.
G. E. Day, B.S.A.	Professor of Animal Husbandry and Farm Superintendent.
H. L. Hutt, B.S.A.	Professor of Horticulture.
J. B. Reynolds, B.A.	Professor in English.
S. F. Edwards, M.Sc.	Professor of Bacteriology.
W. R. Graham, B.S.A.	Manager and Lecturer in Poultry Department.
S. B. McCready, B.A.	Professor of Botany and Nature Study.
R. Harcourt, B.S.A.	Professor of Chemistry.
J. S. C. Bethune M.A., D.C.L.	Professor of Entomology and Zoölogy.
H. R. Rowsome	Lecturer in Apiculture.
W. P Gamble, B.S.A.	Lecturer in Chemistry and Geology.
H. S. Arkell, B.S.A	Lecturer in Animal Husbandry.
T. D. Jarvis, B.S.A.	Lecturer in Entomology and Zoölogy.
E. J. Zavitz, B.A., M.S.F.	Lecturer in Forestry.
W. H Day, B.A.	Lecturer in Physics.
J. Buchanan, B.S.A.	Lecturer in Field Husbandry.
D. H. Jones	Dean of Residence and Instructor in English and Mathematics.
Alice Rowsome, B.A.	Assistant in Library and Instructor in French and German.
J. W. Eastham, B.S.	Demonstrator in Botany.
H. L. Fulmer, B.S.A	Demonstrator in Chemistry.
H. S. Peart, B.S.A.	Demonstrator in Horticulture.
B. Barlow, B.S.	Demonstrator in Bacteriology.
J. E. Howett, B.S.A.	Demonstrator in Botany.
G. G. White, B.S.A	Fellow in Chemistry.
C. C. Thom, B.S.A	Demonstrator in Physics.
Miss Jean McPhee	Demonstrator in Chemistry.
G. Hibberd	Instructor in Drill and Gymnastics.

Office Staff.

S. Springer	Bursar.
J. B. Fairbairn	Secretary.
Miss Annie Hallett	Stenographer.

Physician.

W. O. Stewart, M.D.

Staff of Instructors, Macdonald Institute.

Miss M. U. Watson	Director of Home Economics.
John Evans	Professor of Manual Training.
E. W. Kendall	Instructor in Manual Training.
Miss Helen Given	Instructor in Domestic Science.
Miss Edna M. Ferguson	Assistant in Domestic Science.
Miss Rose Mina Greist	Instructor in Domestic Art.
Annie Ross, M.D.	Instructor in Physiology, Home Nursing, and Emergencies.
Miss Grace Greenwood	Instructor in Normal Methods.
Miss Emma Bigelow	Instructor in Laundry and Household Administration.
Captain Clark	Instructor in Drill and Gymnastics.

ONTARIO AGRICULTURAL COLLEGE

AND

EXPERIMENTAL FARM

FOR THE YEAR 1906.

GUELPH, December 31st, 1906.

To the Honorable the Minister of Agriculture:

SIR,—I have the honor to transmit herewith the Thirty-second Annual Report of the Ontario Agricultural College and Experimental Farm, including the Report of the Macdonald Institute.

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I have the honor to be, Sir,
Your obedient servant,

G. C. CREELMAN,
President.

ONTARIO AGRICULTURAL COLLEGE

PART I.

THE PRESIDENT.

The year 1906 has been marked by steady progress in all departments. The classes have been large and the professors, instructors, and officers have worked faithfully and well. Very little sickness has prevailed, and we close the year with a record of good work well done in the different departments.

CHANGES IN THE STAFF.

In college life it seems impossible to go through any one year without some changes in the faculty of instruction. During 1906 we have lost some good men. Prof. F. Sherman, Jr., of Raleigh, North Carolina, resigned to return to the position he formerly occupied, viz., Professor of Entomology in the State Agricultural College of North Carolina. Prof. Sherman, though with us but one session, made during that time many warm friends and organized the department of Entomology and put it on a good working basis. He was succeeded by Rev. Dr. C. J. S. Bethune, editor of the *Canadian Entomologist.* Dr. Bethune comes to us with an international reputation as an entomologist, and his zeal in the work already started is evidence of his future success in the department.

In Botany, Prof. Wm. Lochhead came back from St. Anne de Bellevue to take charge of the work during the early months of the year, and on his leaving, finally, S. B. McCready, Professor of Nature Study, was transferred to the department of Botany, with the title of Professor of Botany and Nature Study.

The two Demonstrators in Botany, Mr. V. W. Jackson and Mr. E. Thompstone, had been with us but a short time when they were offered splendid positions elsewhere and we were glad to see them receive such promotion. Mr. Jackson went to Auckland, New Zealand, as Instructor in Nature Study and Agriculture, and Mr. Thompstone, to the Presidency of Bombay in India as Assistant Director of Agriculture. We were fortunate in securing the services of two enthusiastic young men for the department of Botany, Mr. J. W. Eastham, graduate in Agriculture from Edinburgh University and for four years Instructor in Science at a county agricultural school at Holmes Chapel in England; and Mr. J. E. Howitt, one of our own graduates, who had been doing post-graduate work at Cornell University since graduating here.

On the 1st of October, Mr. E. G. deCoriolis resigned his position in Chemistry to take an important position on a large sugar cane plantation in Cuba. This position has been filled by the promotion of Mr. H. L. Fulmer. Mr. Fulmer's place, a Fellow in Chemistry, was, in turn, filled by the appointment of Mr. G. G. White, one of our graduates of this year.

For some time we have been considering the advisability of establishing a department of English, with a professor in charge. This work has been superintended and largely conducted by Prof. J. B. Reynolds, but at the same time Prof. Reynolds has also had charge of the work in Physics. This year the work has been divided, and Professor Reynolds is now Professor of English, while Mr. W. H. Day is responsible for the work in Physics, with the title of Lecturer. Mr. Day has as his assistant Mr. C. C. Thom.

It has also been necessary to make a change in the Residence Staff due to the resignation of Mr. F. H. Reed, Resident Master, who goes back into the College Course. This is a most important position, and we were fortunate in securing the services of Mr. D. H. Jones, of the Class of 1906, who is filling the position most acceptably at the present time.

Home Economics.

The work of this department is rapidly finding favor with the people of Ontario, as evidenced by the large number of ladies in attendance. Some changes have also been made in the Institute Staff. Miss M. I. Speller, teacher in Domestic Art, resigned in June, and was succeeded by Miss Rosemina Greist, graduate in Domestic Art of Pratt Institute and Teachers' College, New York. Miss Helen Holland also resigned, and was succeeded by Miss Edna Ferguson, who had substituted for Miss Holland during her leave of absence in the winter term. A new instructor has also been added to the list, in the person of Miss Emma Bigelow as Instructor in Laundry Work.

College Work and Progress.

The work in the different departments of the College has gone on pretty much as usual during the past year. On account of the large classes, especially in the Second Year, the class-room and laboratory work has been heavier than usual. The boys' dormitory is again filled to its utmost capacity and every available space, including the Doctor's office and the rooms in the hospital, has been called into requisition to accommodate students. We are asking at this time for an addition to our dormitory to accommodate forty students.

The bulletins prepared by members of the College Staff and published by the Department of Agriculture during the past year are as follows:

147. "Fruits Recommended for Ontario Planters," by Fruit Experiment Stations.

148. "Experiments with Nodule-forming Bacteria," by F. C. Harrison and B. Barlow.

150. "The Common Fungus and Insect Pests of Growing Vegetable Crops," by W. Lochhead and T. D. Jarvis.

151. "Farm Poultry," by W. R. Graham.

152. "Gardening for Schools," by S. B. McCready.

Forestry.

Although a new department, it has quickly made a place for itself, both at the College and throughout the farming districts of the Province. Applications have been received for more trees than we could possibly supply, notwithstanding the fact that a million seedlings were available this year. During the summer months some half-dozen students at the College were employed in the Forestry department, working regularly ten hours a day and at the same time receiving some instruction in forest nursery work.

Unfortunately, we have no land light enough on the farm suitable for the growing of pine and spruce seedlings. We are therefore obliged to rent a piece of land down on the river. This consists of four acres and was entirely covered with small trees this year. These have now been taken up and will be ready for distribution to the farmers' woodlots in the spring.

SHORT COURSES.

These short courses, inaugurated a few years ago, continue to be very popular with the farming community. Men who are in full sympathy with our work, and yet cannot leave home for an extended course of instruction, take advantage of these short courses to attend lectures at the College for a few weeks. Three courses were given this year: One, a Two-Weeks' Course in Stock and Seed Judging, which was attended by 235 students, ranging in ages from 16 to 70; another, a Four-Weeks' Course in Poultry Culture, at which 28 students were in attendance; and a third, a Three-Months' Course in Dairying, with an attendance of 74.

STOCK JUDGING AT CHICAGO.

Last year I reported that five students from our Senior Class had participated in the Stock Judging Competition at the Great International Live Stock Exposition in the city of Chicago and had been successful in winning the Trophy for the best aggregate score in judging cattle, sheep, and swine. It is with the greatest possible pleasure and pride that I again report success of our team this year. The Trophy must be won three times in succession by the same college, and we have now won it twice. This year we had the additional honor of winning first place in the aggregate score for the judging of four classes of live stock, viz., horses, cattle, sheep, and swine. Mr. R. S. Hamer won this prize. Our boys further distinguished themselves by winning first, third, and fourth places in general proficiency, in competition in a class of 33 young men from the different States of the Union. There were money prizes in the General Proficiency Class, and the three young men mentioned won $160 out of the $300 offered. The names and addresses of the students composing the team are as follows: H. Barton, Vankleek Hill, Ont.; R. S. Hamer, Toronto, Ont.; W. J. Hartman, Woodbridge, Ont.; A. McKenney, Corinth, Ont.; and C. C. Nixon, St. George, Ont.

EXCURSIONS.

Farmers' Institute excursions to the College during the month of June still continue and seem to be as popular as ever. This year the farmers had an opportunity of inspecting our forest nursery and the working of the milking machine, and in both of these departments much interest was shown.

At the Macdonald Institute the women from the farms were entertained and instructed with practical demonstrations in cooking and laundry work by members of the Institute staff.

TEACHERS' CONVENTIONS.

Since the introduction of domestic science, nature study, and manual training into this College, the attention of the public school teachers of the Province has been called to the work of this Institution. During the spring and summer the following county teachers' associations visited us:

May 17 and 18	West Bruce.
May 31 and June 1	East Bruce.
May 31 and June 1	Oxford.
June 15 ann 16	West Huron.
June 15 and 16	Haldimand.
June 22	St. Thomas.

In each case they remained one or two days and were taken in charge by Prof. McCready, who conducted them through the different departments of the College and arranged for an evening programme. At that time the President and members of the Staff explained the workings of the Institution, and pointed out how our plant and equipment here could be utilized by the teachers of the Province for the betterment of rural schools. We found the teachers most interested, and as a result, many of them have come back for short courses in one or more of our departments.

Ontario Teachers' Association.

At their annual meeting at Easter time in the city of Toronto the Ontario Teachers' Association adjourned for one day and came to Guelph to visit the College. They had lunch at Macdonald Hall and spent the entire day going through our buildings and over our grounds. We are always glad to see the teachers here and will welcome them again at any time they see fit to pay us a visit.

British Teachers.

During the Fall Term the British Teachers that have been sent out by Mr. Mosely have been coming to us in small detachments. When Mr. Mosely visited Toronto during the summer, to make arrangements for those teachers to see the school systems of Canada and the United States, he gave implicit instructions to the Toronto authorities to see that arrangements were made that each of the teachers should spend at least one day at the Agricultural College. We have taken great pleasure in entertaining them and giving them an opportunity to see the workings of the Institution.

Press Association.

One of the greatest compliments that has been paid to the Institution for some time was a visit from the Canadian Press Association, at the time of their annual meeting in Toronto. Newspaper men from all over the country were present at that time and spent the entire day with us. Luncheon was prepared and served by the students at Macdonald Institute, and on their return home the Institution received many complimentary letters and newspaper notices from the journalists.

Farmers' Institutes.

On Nov. 18, 19, 20, and 21, the Superintendent of Farmers' Institutes for the Province gathered together at the College all of his Institute workers, some 60 in number, for the purpose of securing for them instruction along special lines, that their instructions to farmers, in turn, might be more uniform. We were glad to have them with us, and our Professors and Instructors, who occupied most of the places on the programme, reported to me that they were highly pleased with the results of the convention. We shall be glad to see them back again at any time, for now that the members of our staff have little time for Farmers' Institute work, I know of no way by which the College work can be presented to the farmers more directly than through the Farmers' Institute workers who, in turn, attend Institute meetings during the winter months.

WOMEN'S INSTITUTES.

On the 12th and 13th of December the Women's Institutes again held their annual convention at the College. More than 300 women assembled from the farms of Ontario and seemed to enjoy to the fullest extent talking over their difficulties and discussing subjects pertaining to the improvement of the home. Our Macdonald Institute students took the greatest interest in these meetings, attending them regularly and taking notes on the subjects discussed.

RETURN VISIT OF THE GOVERNOR-GENERAL.

A special compliment was paid us by the return visit of His Excellency Earl Grey, Governor-General of the Dominion of Canada, who had been with us at the time of the Winter Fair in December, 1905. He was especially desirous of seeing the College when the fields were green and so came back in May, accompanied by Lady Sybil Grey, Miss Howard, and Mr. Leveson-Gower. In Toronto he was joined by Hon. J. J. Foy, Mr. Cathraw Mulock, and Mrs. W. J. Hanna, wife of the Hon. W. J. Hanna, Provincial Secretary. His Excellency and party spent the entire day going over the fields, through the live stock herds, and about the buildings and grounds, and returned to Toronto the same evening. We feel now that His Excellency has a personal interest in the Institution, and we appreciate to the fullest extent the report which he has sent to the Home Government in reference to the Ontario Agricultural College and Experimental Farm.

O. A. C. REVIEW.

We should like to call your speical attention to the work being done by the O.A.C. "Review." This paper began in a modest way about seventeen years ago and has steadily grown in size and quality, until now it is one of the leading school magazines in the country. It is issued regularly on the first of each month, and the training received by certain students in the work of the Review, as managed at the present time, is very helpful to them as a preparation for work in after life. I refer both to the work of the editors and the work of the managers. Many of the strong men among our graduates have been directly connected, while students, with the editing of the College paper.

EXPERIMENTAL UNION.

This meeting was held on the 10th and 11th of December, and with it came large numbers of ex-students, to help along the meeting and at the same time to re-visit their old College home. Everybody missed Mr. C. A. Zavitz, Secretary of the Union, who is spending this year away from the College visiting the different points of agricultural interest in Europe and the United States. He expects to return to his College duties on the first of the year. I beg to call your attention at this time to the excellent manner in which the duties of his office have been performed by the first assistant in the Experimental department, Mr. J. Buchanan, who has been constant in attendance at his duties and faithful in discharging the same.

GRADUATING CLASS.

Of this year's Graduating Class the majority are engaged in farming, and the following are the names of some of those who have secured positions away from home:

AGRICULTURE.

Baker, M. R., Assistant Dominion Fruit Inspector, Ottawa, Ont.

Bracken, J., Good Seeds' Division, Dominion Department of Agriculture, Ottawa, Ont.

Brecken, W. D., Farm Manager, McCabe Estate, Bronte, Ont.

Chisholm, J., Farm Foreman, State University, Columbus, Ohio.

Craig, H. A., Superintendent of Fairs and Institutes, Edmonton, Alberta.

Duncan, R. S., Chemist, Ontario Sugar Co., Berlin, Ont.

Hammond, H. S., Assistant Chemist, Agricultural Experiment Station, Kingston, Rhode Island.

Munroe, J. F., Horticulturist, Experiment Station, Experiment, Georgia.

White, G. G., Fellow in Chemistry, O.A.C., Guelph.

DOMESTIC SCIENCE.

Miss Katharine R. Bartlett, Teacher of Domestic Science, Ladies' College, Halifax, Nova Scotia.

Miss Ethel S. Bodwell, Teacher in Public School, in Northwest.

Miss Mae Card, Women's Institute Worker and Assistant in Chemical Department, Dept. of Agriculture, North Carolina.

Miss Minnie E. Gallup, Teacher of Home Economics in Ottawa Ladies' College, Ottawa, Ont.

Miss R. V. Gardner, Teacher of Home Economics in private school, Far Hills, New Jersey.

Miss Joan Hamilton, Teacher of Domestic Science, Consolidated School, Guelph.

Miss Helen McDunnough, Teacher of Y.W.C.A. Domestic Science Classes, Kingston, Ont.

Miss Maud Penfold, Teacher in Public School, in Northwest.

Miss Frances P. Pritchard, Teacher of Domestic Science, Public School, Florenceville, N.B.

Miss Erie Shand, Matron of Homewood Sanitarium, Guelph, Ont.

Miss Lila Kate White, Dietician in General Hospital, Hamilton.

BUILDINGS ERECTED DURING 1906.

The new machinery hall which was commenced last year has now been completed. It is a handsome red brick building, situated on the site of the old carpenter shop. It presents a fine appearance, is well lighted, and suitable in every way to the purpose for which it was built.

A large addition has also been added to the Chemical Laboratory. This is not yet completed, but when finished, will add very materially to the equipment of that department. This has been found necessary because of the large additional classes in chemistry from Macdonald Institute.

In the Poultry Department a new building has been erected, large enough to accommodate 200 hens. The Poultry Manager wishes to experiment with a large number of hens in one pen. This will give him the opportunity he desires.

OUTSIDE LECTURES.

A number of excellent lectures were delivered before members of our student body in Massey Hall at regular intervals during the year. These lectures proved very interesting and instructive, and we are obliged to these ladies and gentlemen for the assistance they have rendered us:

Dr. Abbott, Toronto, Ont.—"Education."
Mr. James Bowman, London, Ont.—"Pond Life."
Dr. A. P. Coleman, Toronto, Ont.—"South Africa."
Dr. J. Goggin, Toronto, Ont.—"Natural History."
Mrs. Mina B. Hubbard.—"A Woman's Way through the Wilds of Labrador."
Mr. C. C. James, Toronto, Ont.—"The Downfall of the Hurons—The first Chapter in the History of this Province."
Mr. W. E. Saunders, London, Ont.—"Birds."

POULTRY INSTITUTE.

Probably no phase of agricultural work has made such rapid progress as the poultry industry during the last few years. Almost every day brings inquiries from farmers and others, and I am informed by the Deputy Minister of Agriculture that nearly every mail brings to him letters from residents of this Province for bulletins, reports, or general information in reference to the raising of fowl.

At the request of a number of those interested in poultry, we arranged last year for a Poultry Institute, to be held at the close of the Short Course in Poultry Raising. This was eminently successful; great interest was taken in the meeting, large numbers attended, and the report of the meeting, which was printed by the Department, has been in great demand. We hope to make this a permanent part of our work, and the Institute is already being arranged for 1907.

CANADIAN ENTOMOLOGICAL SOCIETY.

During the year the Canadian Entomological Society transferred its headquarters from London, Ont., to the Ontario Agricultural College. This means that our students will have access to a large and valuable collection of insects, as well as to one of the best entomological libraries in America. It means also that the "Canadian Entomologist," of which our Professor of Entomology, Dr. C. J. S. Bethune, has charge, will be edited here. We welcome the Canadian Entomologists to the College and hope we may be able, by increasing the membership and by the increased interest our students and professors will take in the work, to justify the removal of the Society to this place.

CONCLUSION.

In conclusion, I wish to thank you, as Minister of Agriculture, for the continued personal interest you have taken in this Institution; and through you, your Deputy Minister, Mr. C. C. James, who has helped us on so many occasions and at so many points. We realize that as your Department grows, you have less and less time to devote to detail, and yet we have never appealed, either to yourself or your Deputy, without receiving immediately assistance and co-operation.

I have the honor to be,

Your obedient servant,

GUELPH, Dec. 29, '06. G. C. CREELMAN.

STUDENTS OF THE YEAR.

ATTENDANCE.

General Course	314	
Specials in General Course work	16	
Dairy Courses	74	
Short Courses in Stock and Seed Judging	235	
Short Course in Poultry Raising	28	
		667

AT MACDONALD INSTITUTE.

Domestic Science	208	
Nature Study	71	
Manual Training	11	
		290
Total in all Courses		957

There are also 136 students from the Guelph Collegiate Institute who received instruction in Domestic Science at Macdonald Institute.

ANALYSIS OF COLLEGE ROLL (GENERAL COURSE), 1906.

From Ontario.

Brant	7	Muskoka	5
Bruce	5	Northumberland	1
Carleton	7	Norfolk	1
Dufferin	1	Nipissing	1
Dundas	3	Ontario	6
Durham	1	Oxford	4
Elgin	8	Perth	6
Essex	3	Prescott	1
Grey	6	Peel	1
Glengarry	3	Parry Sound	1
Grenville	2	Peterboro	1
Hastings	3	Russell	2
Halton	12	Renfrew	1
Huron	6	Simcoe	12
Kent	1	Victoria	3
Leeds	2	Wentworth	9
Lincoln	3	Welland	9
Lanark	2	Wellington	26
Lambton	4	Waterloo	5
Lennox	2	York	30
Middlesex	9		

From Other Provinces of the Dominion.

Alberta	2	Nova Scotia	8
British Columbia	5	P. E. Island	2
Manitoba	3	Quebec	16
New Brunswick	4	Saskatchewan	3

From Other Countries.

Argentine Rep.	7	Germany	1
Belgium	1	India	1
England	28	Japan	2
Egypt	1	Jamaica	3
France	1	Mexico	1

From Other Countries—Continued.

New Zealand	1
Panama	1
South Africa	2
Scotland	4
Spain	2
U. S. A.	15
Uruguay	1

AGES AND RELIGIOUS DENOMINATIONS.

The limits of age of students in the General Course, 1906, ranged from 16 to 36 years. The average age was 20.

The religious denominations were represented as follows:

Presbyterians	108
Methodists	80
Episcopalian	71
Baptist	27
Roman Catholic	18
Congregational	7
Disciple	5
Friends	3
Unitarian	2
Free Thinker	2
Christadelphian	1
Hinduism	1
New Jerusalem	1
Quaker	1
Jewish	1
Mennonite	1
No Religion	1

BACHELORS OF THE SCIENCE OF AGRICULTURE.

Baker, M. R.	Swartmore, Penn., U.S.A.
Bracken, J.	Seeley's Bay, Ont.
Breckon, W. D.	Waterdown, Ont.
Chisholm, J.	State Univ., Columbus, Ohio.
Clark, J. A.	Bay View, P.E.I.
Colwell, H. H	Oakville, Ont.
Craig, H. A.	North Gower, Ont.
Craig, John	Heward, Sask.
Dickson, J. R.	Seaforth, Ont.
Duncan, R. S.	Huntsville, Ont.
Evens, W. G.	Guelph, Ont.
Hammond, H. S.	Canterbury, England.
Klinck, C. R.	Victoria Square, Ont.
McCredie, A. L.	Lyons, Ont.
MacMillan, H. R.	Aurora, Ont.
McKay, K. G.	Heather Bell, Pictou, N.S.
Munro, W. A.	Chesterville, Ont.
Smith, H. B.	Wanstead, Ont.
Weir, D.	Montreal, Que.
White, G. G.	Perth, Ont.
Zubiaur, A.	Buenos Ayres, Arg. Rep.

RECIPIENTS OF ASSOCIATE DIPLOMA.

Arkell, T. R.	Arkell, Ont.
Austin, H. S.	Lynn Valley, Ont.
Barnet, W. A.	Living Springs, Ont.
Bengough, W. L.	Toronto, Ont.
Brown, W. A.	Meaford, Ont.
Curran, G. B.	Orillia, Ont.
Caesar, L.	Mono Road, Ont.
Carpenter, J. F.	Fruitland, Ont.
Evens, N.	Randolph, Ont.
Frier, G. M.	Shediac, N.B.
Gilmour, J. D.	Doe Lake, Ont.
Glidden, E. K.	Compton, Que.

Recipients of Associate Diploma—Continued.

Goulding, G. C.	Toronto, Ont.
Graham, R. R.	Mitchellville, Ont.
Greenshields, Melville	Montreal, Que.
Hare, J. H.	Cobourg, Ont.
Hayes, J. A.	Sheffington, Que.
Hodson, R. W.	Toronto. Ont.
Jewson, J. E.	Stone Quarry, Ont.
Knight, A. A.	Brackenrig, Ont.
Kerr, W. A.	Ashburn, Ont.
Langley, R.	Chatham, Eng.
McKenzie, D. A.	Greenhill, Ont.
McKinnon, G.	Guelph, Ont.
Middleton, F.	Clinton, Ont.
Murray, Chas.	Avening, Ont.
Nag Tany, B. R.	Toronto, Ont.
Owen, W. C.	Thornton, Ont.
Patch, A. M. W.	Torquay, Eng.
Rose, D. M.	London, Eng.
Row, C. A.	Langhorn, Penn.
Slater, A. E.	Lunbridge, Wales.
Salkeld, D. G.	Goderich, Ont.
Steckley, J. C.	Bethesda, Ont.
Sirett, A. W.	Rosseau, Ont.
Warren, F. B.	Gamebridge, Ont.
Walker, W. E.	Carluke, Ont.
Weaver, J. H.	Westfield, N.Y.
Wheaton, R. R.	Thorndale, Ont.
Wolverton, H. A.	Brandon, Man.
Woods, J.	O. A. C., Guelph.

First Class Men.

The work of the College is divided into departments, and all candidates who obtain an aggregate of seventy-five per cent. of the marks allotted to the subjects in any department, are ranked as first class men in that department. The following list contains the names of those who gained a first class rank in the different departments at the examinations held in April, 1906, arranged alphabetically:

First Year.

Allen, R. J., in one department, English and Mathematics.

Angle, P. E., in one department, English and Mathematics.

Boddy, R. A., in one department, English and Mathematics.

Cutler, G. H., in three departments, English and Mathematics, Physical and Biological Science.

Cooley, R. B., in one department, English and Mathematics.

Duff, H. C., in one department, English and Mathematics.

Holterman, W. I., in one department, Biological Science.

Jackson, W. D., in one department, Biological Science.

Jenkinson, R. H., in one department, Biological Science.

Lang, J. E., in one department, Biological Science.

Lawrence, C. A., in one department, English and Mathematics.

Lewis, F. G., in one department, English and Mathematics.

McEwen, C. F., in one department, English and Mathematics.

McGill, H. W., in one department, English and Mathematics.

McLaren, A., in four departments, English and Mathematics, Physical, Biological, and Agricultural Science.

Sirett, H., in four departments, English and Mathematics, Physical, Biological and Agricultural Science.

Strong, W., in two departments, English and Mathematics, and Biological Science.

Thompson, W. R., in three departments, English and Mathematics, Biological and Physical Science.

Turney, A. G., in two departments, Physical and Biological Science.

Waddell, W. M., in three departments, English and Mathematics, Physical and Biological Science.

Webster, H. B., in three departments, English and Mathematics, Physical and Agricultural Science.

Second Year.

Arkell, T. R., in three departments, English and Mathematics, Physical and Biological Science.

Curran, G. B., in one department, Agriculture.

Frier, G. M., in one department, English and Mathematics.

Gilmour, J. D., in one department, English and Mathematics.

Knight, A. A., in one department, Biology.

Rose, D. M., in two departments, English and Mathematics, and Biology.

Slater, A. E., in two departments, English and Mathematics, and Biology.

Wolverton, H. A., in one department, English and Mathematics.

SCHOLARSHIPS.

Scholarships of $20 each in money were awarded for groups of subjects in first year work as follows: Highest standing with a minimum of forty per cent. of the marks for each subject, and an aggregate of seventy-five per cent. of the total number of marks allotted to the subjects in the group:

English and Mathematics—H. C. Duff, Dobbinton, Ont.
Physical Science—H. B. Webster, Science Hill, Ont.
Biological Science—A. McLaren, Edinburgh, Scotland.
Agricultural Science—H. Sirett, Rosseau, Ontario.

PRIZES—SECOND YEAR.

Prizes amounting to $10 each, in books, were given as follows:

First in General Proficiency, First and Second Year work. Theory and Practice—T. Reg. Arkell, Arkell, Ontario.

Essay, "Improving the Farm Homestead"—D. M. Rose, Woking, England.

MEDAL—SECOND YEAR.

Governor-General's Silver Medal—First in General Proficiency, First and Second Year work, 1905-1906.—T. Reg. Arkell, Arkell, Ontario.

PROFESSIONAL DAIRY SCHOOL CERTIFICATES ISSUED DURING 1906.

Agur, Geo. F.	Jarvis, Ont.	Cheesemaking.
Bathgate, T. D.	Eganville, Ont.	Buttermaking.
Dool, W. W.	Bishop's Mills, Ont.	Cheesemaking.
Freund, W. H.	Columbus, Ohio	Cheesemaking.
Gilholm, Miss B.	Bright, Ont.	Buttermaking.
Godoy, H. V.	Argentine Republic	"
Hooper, V. A.	Fayetteville, Ark.	Butter and Cheesemaking.
Lund, T. H.	George, Iowa, U.S.A.	Buttermaking.
Matheson, Geo.	Shellmouth, Man.	"
Murphy, Wm. J.	Hickson, Ont.	Cheesemaking.
O'Hara, A. J.	Rupert, Que.	Buttermaking.
Stratton, R. W.	Guelph, Ont.	"
Whimsett, F. A.	Cumberland, Ont.	Cheesemaking.

FINANCIAL STATEMENT, 1906.

COLLEGE DEPARTMENT.

EXPENDITURE.

Salaries and wages	$46,569 13	
Meat, bread, groceries, laundry, engine room supplies, and fuel	25,381 22	
Servants' pay list	2,762 13	
Advertising, printing, postage and stationery	3,578 23	
Maintenance, five laboratories	2,998 08	
Expenses, short courses	867 37	
Travelling expenses and extra lectures	1,098 70	
Library	1,997 36	
Scholarships	100 00	
Telephone service, rent, etc	380 00	
Unenumerated	995 59	
Furnishings and repairs	3,499 02	
Sewage	488 25	
School assessment, S. S. No. 7	90 60	
Temporary assistance	882 50	
Student labor	4,600 24	
Total expenditure		**$96,288 42**

REVENUE.

Tuition and laboratory fees	$ 5,651 50	
Board	16,728 77	
Supplemental examinations	54 00	
Rent of Post Office boxes, Sept., 1906, to Sept., 1907	39 00	
Fines and breakages, Sept., 1905, to Sept. 1906	337 41	
Analysis of water (Chem. Laboratory)	26 00	
Rent of cottages	220 00	
Sale of brushwood	2 00	
Sale of old range	2 00	
Sale of old mare $100.00 (less service of horse, $11.00)	89 00	
Sale of old refrigerator	7 00	
Sale of windmill top	4 00	
Rent of rooms	76 00	
Sale of scrap iron	10 00	
Total revenue		$23,246 **68**
Net expenditure		73,041 **74**

MACDONALD INSTITUTE AND HALL.

EXPENDITURE.

Salaries and wages	$14,410 00	
Servants' pay list	1,724 80	
Bread, meat, groceries, furnishings, repairs, engine room supplies and fuel	12,523 88	
Maintenance of laboratories in Institute	2,840 72	
Library and stationery	1,197 46	
Total expenditure		$32,696 **86**

REVENUE.

Tuition and laboratory fees	$ 4,243 50	
Board	11,412 55	
Sale of supplies to nature study students	25 13	
Fines and breakages	207 90	
Total revenue		$15,889 **08**
Net expenditure		16,807 **78**

FORESTRY DEPARTMENT.

EXPENDITURE.

Wages, trees, seeds, furnishings, repairs, etc	$3,485 48

STUDENT LABOR, 1906.

TOTAL PER MONTH.

January	$542 35	
February	634 38	
March	394 10	
April	186 45	
May	337 65	
June	408 72	
July	331 30	
August	33 17	
September	311 32	
October	660 94	
November and December	759 86	
		$4,600 24

TO DIFFERENT DEPARTMENTS.

College Department	$427 88	
Macdonald Institute	13 56	
Forestry	2 97	
Chemical Laboratory	85 12	
Bacteriological	11 80	
Entomological	242 99	
Physical	138 64	
Biological	42 88	
Farm Department	935 89	
Experimental	765 24	
Poultry	606 19	
Horticultural	547 62	
Dairy Department	275 63	
Mechanical	503 83	
		$4,600 24

FARM DEPARTMENT.

EXPENDITURE.

Permanent improvements	$ 498 52	
Wages of foremen, men, and stenographer	5,129 04	
Purchase of stock for breeding and feeding	7,969 90	
Maintenance of stock, feed, etc	1,490 31	
Farm maintenance (including repairs, blacksmithing, binder twine, seed, furnishings, fuel, light, advertising, printing, stationery, tools, implements, etc.)	1,649 28	
Contingencies	180 34	
Total expenditure		$16,917 39

REVENUE.

Sale of Cattle:		
32 steers, 43,145 lbs., at from 4c. to 5c	$2,112 30	
13 steers for	545 00	
2 bulls for	95 00	
3 cows, 2 heifers and 1 calf	305 00	
		$3,057 30

Sale of Pigs:		
122 hogs, 24,478 lbs., at from $4.70 to $7.75 cwt.	$1,615 74	
16 pigs for	174 50	
		1,790 24
Sale of Sheep:		
5 sheep	$21 00	
10 lambs	40 00	
		61 00
Sale of Carcasses used at Short Courses:		
4 beef, 4,010 lbs., at 7c., $280.70; 4 hides, $32.60; less killing, $14.65	$298 65	
		298 65
Service of Animals:		
Bull	$55 00	
Boar	48 50	
Ram	20 00	
		$123 50
Sale of Wool:		
128 lbs. unwashed, at 15½	$19 85	
225 lbs. unwashed, at 19c	42 75	
		62 60
Sale of Hides:		
2 for $7.16		7.16
Sale of old team		85 00
Sale of old iron		1 50
Sale of Grain:		
188 bushels barley at 75c	$141 00	
157 bushels, 35 lbs., wheat at 70c	110 30	
24 bushels oats at 50c	12 00	
2 bushels corn at $1.00	2 00	
		265 30
Sale of Potatoes:		
96 bags at 90c	$86 40	
8 8-9 bags at 75c	5 15	
		91 55
Sale of Bags:		
85 at 20c		17 00
Total revenue		$5,860 80
Net expenditure		11,056 59

[N.B.—Nothing allowed the Farm department for the feed of dairy stock, feed, etc., of the department horses and supplies for the College.]

EXPERIMENTAL DEPARTMENT.

Expenditure.

Permanent improvements	$ 415 39	
Assistant, specialist in plant breeding, stenographer, foreman, teamsters and laborers	6,308 72	
Seeds, manure and special fertilizers	504 15	
Furnishings, implements, repairs (blacksmithing, etc.)	497 62	
Printing, postage, stationery, contingencies, etc	324 39	
		$8,050 27

DAIRY DEPARTMENT.

Expenditure.

Permanent improvements, including milking machine ($200.00)	$224 07
Wages, including foreman, cheesemaker, buttermaker, herdsman, engineer, stenographer and book-keeper	2,571 14
Milk for experimental cheese and butter making	8,223 40
Purchase of cows	759 00

Feed and fodder		260 27	
Furniture, furnishings, repairs, etc., laboratory expenses, gas, chemicals, etc., and contingencies		609 46	
Fuel and light		680 07	
Total expenditure			$13,328 01

REVENUE.

Sale of Butter:			
39,113 lbs. at from 15c. to 30c.		$9,129 13	
Sale of Cheese:			
12,958¼ lbs. at from 8c. to 15c.		1,597 60	
Sale of Milk:			
6,145 quarts at 4c.	245 80		
21,892¾ lbs. at $1.60 cwt.	350 26		
		596 06	
Sale of Skim Milk and Whey:			
64,000 lbs. at 10c. cwt.	$64 00		
8,150 lbs. at 20c. cwt.	16 30		
Season's whey	20 00		
		100 30	
Sale of Cream:			
1,083 3-5 quarts at from 15c. to 40c.		210 88	
Sale of Cattle:			
11 calves	$ 21 50		
3 bull calves	110 00		
9 cows	245 00		
		376 50	
Sundries:			
Rennet	$ 60		
Milk tested	1 25		
3 butter boxes	60		
1 bottle	25		
Old pump	5 00		
Old rope	40		
Refund express	30		
Rent of house	16 00		
		25 40	
Total revenue			$12,035 87
Net expenditure			1,292 14

[N.B.—Nothing allowed for milk and cream supplied by Dairy Department to the College.]

DAIRY SCHOOL DEPARTMENT.

EXPENDITURE.

Permanent improvements, cement floors, walks, etc.	$ 3 55	
Wages of instructors, engineer, janitor, stenographer and book-keeper	1,575 00	
Cleaning, painting, repairs and contingencies	233 55	
Dairy appliances, separators, vats, expenses cheese and butter judges, inspecting factories, etc.	469 86	
Advertising, printing, stationery, postage, books, papers, etc.	94 09	
Fuel and light	593 30	
Purchase of milk for use in school	3,835 47	
Total expenditure		$6,804 82

REVENUE.

Fees:		
34 residents	$34 00	
6 non-residents	36 00	
		$ 70 00

Breakages		3 75	
Sale of Butter:			
11,742 lbs. at from 15c. to 30c.		3,034 39	
Sale of Cheese:			
2,445½ lbs. at from 5c. to 13c.		261 02	
Sale of Milk:			
1,625 quarts at 4c.	$ 65 00		
9.481½ lbs. at $1.60 cwt.	151 69		
		216 69	
Sale of Cream:			
452 quarts at 20c.		90 40	
Sundries:			
Milk tested	$ 10		
Refund freight	1 25		
Old iron	20		
		1 55	
Total revenue			$3,677 80
Net expenditure			3,127 02

[N.B.—Allowing nothing for milk and cream supplied to the College by the Dairy School.]

POULTRY DEPARTMENT.

EXPENDITURE.

Wages of assistant, stenographer, and temporary assistance	$ 813 60	
Furnishings and repairs	507 60	
Permanent improvements	89 96	
Purchase of stock	199 95	
Purchase of horse	175 00	
Fuel, light and contingencies	305 11	
Experiments with incubator, fattening and feed	1,743 67	
Total expenditure		$3,834 89

REVENUE.

Sale of Eggs:			
For Hatching—			
1,092 eggs at 5c.	$ 54 60		
107⅔ set. at from 75c. to $2.50	128 75		
		$183 35	
For Domestic Use—			
1,072⅓ dozen at from 10c. to 35c.		208 77	
Sale of Live Poultry:			
127 birds at from $1.00 to $50.00		307 60	
Sale of Dressed Poultry:			
4,440 lbs. at from 10c. to 44c.	$604 35		
106 ducks	66 40		
2 geese at $1.00	2 00		
8 squabs at 25c.	2 00		
		674 75	
Sale of Feathers:			
5 lbs. at 25c.		1 25	
Sale of 100 lbs. beef scrap		3 00	
Total revenue			$1,378 72
Net expenditure			2,456 17

HORTICULTURAL DEPARTMENT.

Expenditure.

Permanent improvements	$ 202 55	
Head gardener and foreman, florist, assistant in plant breeding, assistant and night fireman, teamsters, assistant gardener, stenographer and laborers	5,864 65	
Manure, trees, plants, bulbs, seeds, cold storage experiments, implements, tools, furnishings, repairs and contingencies	1,394 28	
Fuel and light	997 58	
Wax fruit models	399 55	
Total expenditure		$8,858 61

Revenue.

60½ crates strawberries at $1.00	$60 50	
12¼ dozen cabbage at 40c	4 90	
4½ bags onions at $1.00	4 50	
¼ dozen squash at $1.00	25	
Total revenue		$70 15
Net expenditure		8,788 46

Note. Products supplied to College, except when more than required.

MECHANICAL DEPARTMENT.

Expenditure.

Salary of foreman	$800 00	
Tools, fuel and light	136 45	
Total expenditure		$936 45

SUMMARY.

	Expenditure.	Revenue.	Net Expend.
College Department	$96,288 42	$23,246 68	$72,041 74
Forestry Department	3,485 48	....	3,485 48
Macdonald Institute and Hall	32,696 86	15,889 08	16,807 78
Total	$132,470 76	$39,135 76	$93,335 00
Farm Department	$16,917 39	$ 5,860 80	$11,056 59
Experimental Department	8,050 27	....	8,050 27
Dairy Department	13,328 01	12,035 87	1,292 14
Dairy School	6,804 82	3,677 80	3,127 02
Poultry Department	3,834 89	1,378 72	2,456 17
Horticultural Department	8 858 61	70 15	8,788 46
Mechanical Department	936 45	....	936 45
Total	$58,730 44	$23,023 34	$35,707 10

Total net expenditure, College	$93,335 00
Total net expenditure, Farm	35,707 10
Total net expenditure	$129,042 10

Yours truly,
S. Springer,
Bursar and Superintendent.

PART II.

THE DEAN OF RESIDENCE.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to present my report as Dean of the Residence for the year ending Dec. 31st, 1906.

With the new year my tenure of office as Resident Master began. My duties required me to preside in the college dining-hall, to conduct roll-call and prayers, to see that the evening study hour was observed, and to adopt all measures whereby a healthy, happy, wholesome life should obtain for the students in residence, and that should ensure the prevalence of that mental, moral, and social atmosphere within the dormitories most conducive to profitable study.

As I had lived in the College under the *regime* of the last two of my predecessors, I was able to appreciate the many worthy features of the dormitory discipline which they advocated and maintained; and it has been my endeavor to carry on the work of residence management with similar ideals in view to those which were entertained by these gentlemen, Messrs. McLean and Reed.

On entering upon my duties I found that there were 175 students in residence. This meant that every bed in the institution, including the five beds in the hospital, was occupied. So long as there was no sickness this arrangement worked all right; but when, as was the case several times, a student was indisposed for a few days, during which time it was desirable for him to remain in his room, considerable inconvenience was caused. However, we had no sickness worse than influenza, colds and tonsilitis.

During the summer the halls and rooms were whitewashed and considerable painting was done, thereby giving the interior a bright and cheerful aspect. The roof, however, is somewhat out of repair. Into some of the rooms on the upper flat the water percolates during rain-storms and when the snow melts. It is the opinion of Mr. Crawford that a new roof is necessary, for the repairs done during the summer have proven ineffectual, and such, he says, has been the case for five or six years, no patching being adequate to the requirements of the case.

Our smokers, though few in number, are grateful for the renovation and re-furnishing of the smoking-room. Though promiscuous smoking in the residence was never common, the general comfort and bright appearance of the smoking-room this year has reduced the practice, and soon we expect to have smoking confined entirely to the one room prepared for it.

On the whole, the students realize that within the residence they have better opportunities for pursuing their studies and for developing themselves generally, than obtains outside. The consequence is, that whenever a vacancy occurs, we have a number of applications from outside boarders for the place.

It has been our policy, as far as possible, to instil into each individual student a spirit of self-dependence, self-reliance, and self-government, by placing him on his own responsibility, and in the majority of cases the result has been most gratifying. On the whole, the men realize that they are on their honor and conduct themselves accordingly.

Respectfully submitted,

DAN. H. JONES.

PART III.

THE PROFESSOR OF ENGLISH.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit herewith my twelfth annual report in the department of English.

My previous reports have been from two distinct departments, Physics and English. Early in the present year a division of the two departments was effected, whereby I assumed charge of the English department and relinquished the work of the department of Physics. For some years I have recommended the appointing of a Professor of English, since the work of the two departments had been proving too onerous and too distracting to enable me to do justice to either. I had not seriously entertained the idea of surrendering the work in Physics, since that work appeared to offer greater opportunities at an agricultural college than the work in English. Upon your suggestion, however, I finally agreed to the change that has been made. Although I felt at the time, and feel yet, that I have sacrificed opportunities for serving the larger public outside the College, nevertheless, I believe that the solution that was adopted was the best possible.

THE WORK IN PHYSICS.

The work in Physics has been, during my time here, built up from the bottom. Practically no Physics had been taught, and certainly no investigation work had been undertaken until about ten years ago. The work has extended until it covers studies and investigation throughout the four years of the agricultural course; besides, it has offered several lines of independent investigation which have proved of considerable interest and importance. At the present time new lines of investigation have been taken up, and with the new equipment which the department of Physics is being provided with, in the shape of glass houses for soil investigation, still greater opportunities will present themselves.

My personal regret at surrendering this inviting field of work was lessened by the fact that it was being handed over to one thoroughly capable of taking charge of it. Mr. Day, the present head of the Physics department, had proved himself a most capable assistant, and had given evidence of being a careful and original investigator. In the short time that he has had sole charge of the department, he has fully justified the confidence that was placed in him, and I am sure that he will develop to the full extent the possibilities offered by this branch of agricultural science.

A little over a year ago some work in drainage was undertaken by the department of Physics, whereby the department agreed to survey farm lands that required drainage and to prepare plans and furnish directions, by the aid of which the work of drainage could be successfully completed for each area surveyed. This offer met with the approval of the Minister and was announced through the public press, and the response has been gratifying. The engineering difficulties are easily dealt with through the aid of the instruments which we have in the department of Physics, and the technical problems have been made the subject of study for some years in that department. Personally, in reporting upon the work that I have done myself, I am much gratified in knowing that I have been enabled to give correct advice in several rather difficult situations and have enabled farmers to go confidently with the work of draining land. As I had personally engaged to carry out certain pieces of work in different parts of the country before surrendering charge of the department of Physics, I have attended to these myself during the past season, and have surveyed four farms at Winona, two at Jordan Harbor, one at Mount Forest, one at Exeter, and two at Fergus. In addition to these, Mr. Day will, of course, report upon the places that he visited, and, I believe, he has done more work in this direction than I have done.

In one instance I found a tract of 50 acres of land of first-class quality that, nevertheless, had never produced a full crop, because it was lying low and flat. Over this tract of land there was a fall of only one and a quarter inches in one hundred feet. With careful grading of the ditch bottom and careful laying of the tile, this fall will carry off the water satisfactorily. At another point, I had a farm of 75 acres to survey. This farm had been occupied by the present owner for twenty years, and he had, during all that time, been aware that over a large part of his farm drainage was badly needed. In this particular instance the owner had been balked by two difficulties, first, to know the direction in which the water should be carried at certain places in the farm; and, secondly, until this were definitely decided he could not force an outlet, since the outlet in any event must be found through a neighbor's farm. When it had been determined by the levelling instrument that the natural outlet was in a certain direction, the neighbor, over whose land the water was to be carried, acquiesced. Up to that time the owner had not been able to obtain acquiescence on the plea that possibly the natural water course was in the opposite direction. Still another instance: At Jordan Harbor a little patch of peach trees in the middle of an orchard had been killed out by the wet soil. I was able to show the owner that this little patch of land could be drained without difficulty and the drain joined to a neighbor's drain, who also was undertaking a similar work for his own orchard. In the latter instance the total cost of the drain would be less than the owner's loss in peach trees.

Another line of investigation that I have continued in connection with the Physics is an inquiry into the growing of tobacco in southern Ontario. My report upon this will be forwarded to the Department of Agriculture separately.

THE WORK IN ENGLISH.

The work in English at present consists of a course with each of the four classes at the Agricultural College; and, in addition, a course with three classes at the Macdonald Institute. The work at the Agricultural College proper has passed the experimental stage and has been reduced to a satisfactory system, wherein the grade and quantity of work assigned to each class seems to be suited to the requirements of that class. The English course at the Macdonald Institute, however, is as yet in the experimental stage, this being the first year in which we have followed any prescribed course with classes there. The classes taking English are: The Senior Normal class, the Junior Normal class, and the Home Makers. The Normal classes are, by the requirements for admission to the Institute, University Matriculants. Some of the students of last year having expressed a wish to follow university work with a view to admission to university standing in Domestic Science, I have specified for the Junior Normal class the first year University English and for the Senior Normal class the second year

University English. Arrangements have not yet been completed whereby, upon passing the English examinations in the first and second years the Normal classes will be admitted to the University *pro tanto*; and I herewith direct your attention to the question: Provided the Junior Normal class are successful in passing the Senior Matriculation examination in English and, thereafter, in the following year, succeed in passing the second year English at the University, will they be granted *pro tanto* standing in these subjects? This is a question to be taken up with the University Senate.

The Home Makers' class for the present year have been assigned the same work in English as our Second Year class. On account of the very large number in the present Second Year, the union of the two classes makes the class entirely too large for satisfactory work. This is an experiment which I shall not care to repeat. I find it impossible to do any kind of individual work with students in very large classes, and a certain amount of individual work is necessary in the way of questioning, reading in classes, and other exercises, before satisfactory results can be attained. Either the classes must be taken separately, or some other combination must be sought.

While joint classes will be advisable in order to prevent duplication of work, the joining will have to be effected with classes numerically small. The present Second Year, even by itself, is too large for satisfactory work. The First Year class was divided some years ago on account of being too numerous to be handled singly, when the number of the class was not greater than that of the present Second Year. For English work, at any rate, if the number of this class continues to be as great as it is this year, it will be advisable to consider continuing in the Second Year the division adopted in the First Year.

I wish to add that the additions to the Library for the department of English have been liberal in number and well chosen. Also, I desire to express my high appreciation of the services of Mr. D. H. Jones, Dean of the Residence, for the assistance that he has rendered in teaching English. Mr. Jones is very well read, and has proved himself capable of handling English classes efficiently.

Respectfully submitted,

J. B. REYNOLDS.

PART IV.

THE LECTURER IN PHYSICS.

To The President of the Ontario Agricultural College:

Sir,—I have the honor to submit herewith my first report as head of the department of Physics.

Until the close of the last academic year, English and Physics constituted one department, under the direction of Professor J. B. Reynolds. But in April the department was divided, the Physics being placed under the direction of the writer, with Mr. C. C. Thom as assistant. It has been our endeavor to continue the work of the department on the same broad, practical lines followed by Prof. Reynolds.

In the first year the instruction in the department consists of courses in arithmetic, hydrostatics as a preparation for and followed by Soil Physics, and lastly a course in the principles of mechanics. The work of the second years consists of surveying, drainage, and farm power by electricity, wind and water. The third year make a specialty of meteorology, cold storage, ventilation, based upon a thorough course in Heat. In the final year, climatology, advanced drainage, and advanced soil Physics are emphasized.

LABORATORY WORK.

Laboratory practice is given all the years in the various subjects. There is one change that I would respectfully submit for your consideration, viz., that the present practical work in Soil Physics, instead of coming in the fourth year, be transferred to the second year. This work illustrates and impresses the elementary and fundamental principles that govern the securing of proper soil conditions. Under existing arrangements, men completing the diploma course and not returning for the degree have little or no practical work in this subject, though such a course would enable them to grasp more fully the importance of the physical properties of the soil such as moisture, heat, air, and sanitary conditions; and not only to grasp their importance but to control them by adapting actual tillage operations to the producing of the desired conditions. This change would not necessitate any more time—merely a re-arrangement of our present time—but it would necessitate the fitting up of a portion of our present laboratory space specially for work in Soil Physics. In the fourth year, we are unable to do any advanced work on this subject, because all the time at the disposal of the class is taken up with the elementary experiments which are necessary before problems more involved can be undertaken. Under the proposed re-arrangement, the elementary work would be covered in the second year, leaving the final year free for the laboratory study of more advanced problems. It is only fair to add that this proposition was under consideration at the time the department was divided.

DRAINAGE.

The work of assisting farmers in the drainage of their lands begun last year has been continued. In July the following announcement was sent to some 200 of the papers of the Province:

"The department of Physics is endeavoring to emphasize to farmers the importance of the proper drainage of their land, and has brought the matter to the attention of the Ontario Minister of Agriculture. The matter has met with such hearty approval from him that he has authorized the department to send representatives among the farmers where requested, to take the levels of land, locate the drains, and give information generally on the subject, the only expense connected with it being the travelling expenses of one man. It is the intention that where two or more persons in the same vicinity have work to be done they arrange together to have all done during the same trip, each one paying his proportionate share of the expenses. This, of course, reduces the individual outlay to a very small sum."

This announcement was warmly received by the papers generally, as most of them not only published it but also editorials on the subject. The response from the people has been very gratifying. We have already done work for some thirteen or fourteen different parties, and have several other enquiries, some of which will doubtless result in further demands upon our services.

WEATHER REPORT FOR 1906.

Weather records have been kept at Guelph and other stations as in previous years. The results are given in the following tables:

Table I. Weather Report of 1896 at the O. A. C., Guelph.

	Jany.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Mean temperatures	28.4	20.7	23.9	44.2	55.2	65.2	67.7	69.5	63.6	47.7	34.0	20.0	45.00
Departure from normal	+9.6	+1.7	-2.7	+2.5	+1.7	+1.7	-.4	+3.3	+4.5	+.8	0.0	-4.8	+1.5
Lowest temperature	5.0	-15.5	-2.5	27.0	30.5	40.0	42.0	47.0	33.0	23.0	20.0	-8.0	-15.5
Highest temperature	57.0	56.7	45.0	70.5	82.5	87.0	85.5	87.5	89.0	73.0	56.0	39.0	89.0
Snowfall in inches	9.75	6.00	11.65	2.75	......	......	......	......	......	1.10	......	6.00	37.2
Rainfall in inches	1.74	.20	.67	1.166	2.71	4.06	4.65	2.13	2.49	4.27	2.35	1.27	27.70
*Precipitation in inches	2.72	.80	1.83	1.44	2.71	4.06	4.65	2.13	2.49	4.38	2.35	1.87	31.42
Departure from normal	+.81	-.80	+.43	-.13	+.41	+1.02	+1.63	-.13	+.21	+2.01	+.25	+.19	5.86

* Calculated by 10 inches of snow being equivalent to one inch of rain.

Table II. Temperatures at Outside Stations.

Mean temperatures.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Maitland	24.33	16.25	23.54	38.65	50.10	65.20	69.32	70.58	61.91	47.38	31.96	13.64	42.74
Magnetawan	20.36	13.32	13.94	39.45	46.88	62.00	63.91	64.98	58.94	43.85	29.46	9.66	38.90
Marksville	24.78	20.76	20.58	40.46	47.58	61.50	64.8	65.8	60.43	44.58	34.55	16.53	41.86
Milberta (Charlton)	11.90	4.54	6.90	39.11	45.33	61.82	63.90	64.40	57.00	42.56	24.35	4.41	35.52
Bay View, P. E. I.	......	......	......	......	......	......	66.3	65.9	55.6	48.0	36.14	22.17	......
Leamington	......	......	......	......	......	......	70.17	74.21	68.83	50.74	39.08	28.67	......
Highest temperatures.													
Maitland	59.0	53.0	39.0	69.0	79.0	84.0	88.0	91.0	86.0	79.0	56.0	42.0	91.0
Magnetawan	53.0	45.0	43 0	68.0	81.0	81.0	85.0	85.5	83.0	75.0	50.0	39.0	85.5
Marksville	44.0	48.0	42.0	65.0	77.0	80.0	86.0	85.0	87.0	75.0	46.0	38.0	87.0
Milberta (Charlton)	39.0	46.0	32.0	68.0	80.0	85.0	89.0	91.5	90.0	75.0	46.0	35.0	91.5
Bay View, P. E. I.	......	......	......	......	......	......	83.0	86.0	76.5	70.0	46.0	49.0	86.0
Leamington	......	......	......	......	......	......	88.0	89.0	89.0	74.0	56.0	49.0	89.0
Lowest temperatures.													
Maitland	-5.0	-21.0	-1.0	19.0	30.0	37.0	46.0	43.0	31.0	20.0	12.0	-21.0	-21.0
Magnetawan	-25.0	-38.0	-22.0	13.0	24.5	30.0	35.0	38.5	27.0	18.0	1.5	-34.0	-38.0
Marksville	-9.0	-40.0	-20.0	21.0	25.0	34.0	42.0	40.0	35.0	20.0	11.0	-23.0	-40.0
Milberta (Charlton)	-26.0	-45.0	-27.0	18.0	20.0	25.0	33.0	33.5	27.0	15.0	-8.0	-40.0	-45.0
Bay View, P. E. I.	......	......	......	......	......	......	48.0	47.0	38.0	28.0	21.0	-5.0	......
Leamington	......	......	......	......	......	......	49.0	51.0	40.0	25.0	22.0	10.0	......

Table III. Summary O. A. C.

Year.	Snow.	Rain.	Precipitation.	Mean Temperatures.	Date of last killing frost in Spring.	Date of first killing frost in Autumn.	Days between killing frosts.
1882	54.8	17.95	23.43	44.0	May 6......	Oct. 19......	166
1883	53.5	18.16	23.51	41.9	" 10......	Sept. 9......	122
1884	57.7	20.22	25.99	43.4	" 29......	" 19......	113
1885	45.7	15.57	20.14	40.9	" 11......	....	....
1886	70.3	22.43	29.46	43.2	" 17......	Oct. 16......	152
1887	51 4	15.78	20.92	43.5	April 27......	Sept. 24......	150
1888	32.7	17.99	21.26	42.0	May 2......	" 14......	135
1889	76.6	20.16	27.82	44.2	April 22......	Oct. 6......	168
1890	15.1	16.22	17.73	44.7	May 21......	Sept. 25......	127
1891	56.9	24.91	30.60	47.5	" 24......	" 1......	100
1892	26.3	25.05	27.68	43.2	" 28......	Oct. 2......	127
......	......	......	......	......	......	......	......
1899	26.0	20.48	23.08	42.1	April 16......	Sept. 23......	160
1900	41.1	22.61	26.72	45.6	May 10......	Oct. 17......	160
1901	56.7	22.48	28.15	43.1	" 15......	" 4......	141
1902	30.0	25.13	28.13	43.3	" 10......	" 10......	153
1903	22.2	19.47	21.69	44.4	" 2......	Sept. 29......	150
1904	51.3	23.88	29.01	40.1	April 22......	Oct. 4......	165
1905	47.1	24.18	28.89	43.6	" 24......	Sept. 26......	154
1906	37.2	27.70	31.42	45.0	" 28......	Oct. 11......	166
Average.	44.9	21.07	25.56	43.5	....	....	145

Table IV. Precipitation at Outside Stations.

Precipitation.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Year.
Maitland.													
Rain	1.30	.45	1.05	.76	1.75	5.42	1.30	1.53	3.12	2.83	1.53	1.01	22.05
Snow	1.2	3.5	2.2	.6	.....	.....	.....	.....	.....	.....	4.	6.50	18.00
Precipitation, rain	1.42	.80	1.27	.82	1.75	5.42	1.30	1.53	3.12	2.83	1.93	1.66	23.85
Magnetawan.													
Rain	2.31	.57	1.74	2.57	1.95	6.52	.64	8.80	3.49	5.25	2.96	.92	37.72
Snow	24.3	21.2	17.4	2.5	.....	.....	.....	.....	.....	2.2	7.7	19.8	95.10
Precipitation	4.74	2.69	3.48	2.82	1.95	6.52	.64	8.80	3.49	5.47	3.73	2.90	47.23
Marksville.													
Rain	0.	0.	1.0	1.70	2.06	4.94	1.34	1.63	3.85	3.16	2.32	.5	22.5
Snow	12.0	6.0	20.0	.....	.....	.....	.....	.....	.....	.....	4.0	13.0	55.
Precipitation.	1.2	.6	3.00	1.70	2.06	4.94	1.34	1.63	3.85	3.16	2.72	1.8	28.00
Milberta.													
Rain	2.0	1.0	.....	.....	2.81	3.92	3.24	1.63	2.24	2.40	.4	.....	19.64
Snow	12.0	14.0	25.0	.....	.....	.....	.....	.....	.....	3.0	11.0	9.0	74.00
Precipitation	3.2	2.4	2.5	0.	2.81	3.92	3.24	1.63	2.24	2.70	1.5	.9	27.04
Bay View, P. E. I.													
Rain	.....	.....	.....	.....	.....	.....	.....	1.59	2.33	3.13	8.49	3.28	.....
Snow	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5.45	40.20	.....
Precipitation.	.....	.....	.....	.....	.....	.....	.....	1.59	2.33	3.13	9.04	7.30	.....
Leamington.													
Rain	.....	.....	.....	.....	.....	.....	3.14	1.67	1.71	3.55	2.79	3.80	.....
Snow	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6.50	.....
Precipitation.	.....	.....	.....	.....	.....	.....	3.14	1.67	1.71	3.55	2.79	4.45	.....

Table V. Length of Season at Outside Stations.

Station.	Last killing frost in Spring.		First killing frost in Autumn.		No. of days between.
	Date.	Deg.	Date.	Deg.	
Maitland....................	May 10th	30	Oct. 7th	30	150
Magnetawan..................	June 12th	30	Sept. 24th	27	104
Marksville..................	May 30th	30	Oct. 1st	30	124
Milberta....................	June 12th	30	Sept. 15th	29	94
Bay View....................			Oct. 17th	28	
Leamington..................			Oct. 10th	30	

INVESTIGATIONS.

EVAPORATION.

In last year's report of this department, under the heading "Investigations in Transpiration," mention was made of the fact that we had been hampered in our work by the lack of a reliable evaporimeter, and that we were designing one that we hoped would prove satisfactory. I am glad to be able to state that the instrument has been a success beyond our most sanguine expectations, and the results are so promising that, as a matter of prudence, I refrain from publishing a description of the instrument now.

Table VI. Showing Depth of Evaporation.

Small evaporimeter in thermometer shelter.			Large evaporimeter in open reservoir 100 feet x 60 feet and 12 feet deep.			
Period.	Evaporation: Depth in inches.		Period.	Evaporation: Depth in inches.		Total for month at same average per day.
	Total for Period.	Mean Daily.		Total for Period.	Mean Daily.	
May 17-31	3.600	.240				
June 29 days..	4.996	.172	June 23-27 and 30th..	.950	.158	4.640
July 31 " ..	6.400	.206	July 21 days........	4.696	.213	6.603
Aug. 31 " ..	6.644	.215	August 28 days......	6.594	.236	7.316
Sept. 30 " ..	5.642	.188	Sept. 24 days	5.577	.232	6.960
Oct. 1-8 " ..	.836	.104	Oct. 29 days........	4.108	.142	4.402
			Nov. 1-25...........	1.667	.067	2.010
144 days.	28.118	.195	133 days.		.175	31.931

The work this year has consisted in measuring the evaporation in our thermometer shelter and from the surface of the reservoir. The results are given. From the small evaporimeter only one reading is lacking throughout the entire summer, but for the large one 24 readings are missing. The difference is accounted for by the fact that the small one had been tested for several months during the winter, and all its proportions and adjustments were right when it was started in May. The large one was put in actual operation as soon as completed, and various minor alterations in adjustment and proportion of parts were necessary. Toward the end of the season, its record is more continuous, and barring interference, which occurred once this summer, we see no reason why its records should not be as continuous next year as those of the smaller one.

Table VII. Showing Rainfall.

Period.	Depth in inches.	
	Total for period.	Mean daily.
May 17-31	.95	063
June	4.06	.135
July	4.65	.150
August	2.13	.069
September	2.49	.083
October 1-8	1.01	.141
October 9-31	3.37	
November 1-25	1.85	.074

Mean Annual Precipitation 26.76.

After October 8th, the small evaporimeter was frozen most of the time, so the readings were discontinued. But the large one on the reservoir, though it frequently froze a little at night, thawed out in the morning, and the readings were continuous until November 25th. The results, of course, are incomplete, but they show what vast amounts of water pass into the air by evaporation. One-fifth of an inch or .200 in one day would mean 20 barrels of 31.25 gallons each from the reservoir, or 140 barrels per acre. The average daily evaporation for the whole period of measurement was .175 of an inch, which is equivalent to 17.5 barrels per day from the reservoir throughout the entire period. The total evaporation from June to November, inclusive, was 31.931 inches, or 3,193 barrels. At the same rate for the 24 days on which readings were missed, the total evaporation from June 23rd to November 25th would be 37.693 inches, or 3,769.3 barrels from the reservoir. A table showing the rainfall during the period is also given. For all months save November, the evaporation is much in excess of the rainfall. And for the six months of measurement, the evaporation of 37.693 inches is 10.933 inches in excess of the *mean annual* rainfall of 26.76 inches.

We have had several enquiries regarding the amount of evaporation from water surfaces in Ontario, but have been unable to answer the same because the data were not to be had. We are endeavoring to solve this problem, very approximately at least, for the entire Province.

Of evaporation from land surfaces in our latitude and climate but little is known, yet it is of paramount importance to the agriculturists of this country; for of all the factors producing loss of soil moisture, evaporation is the most potent. We hope to do extensive work on this branch of the problem, and by calling attention to the vast amounts of water that a soil may lose in this way, even in one week, to impress upon the farmers more strongly than ever the prime importance of taking proper steps to conserve the soil moisture by checking evaporation.

WATER FOR VARIOUS CROPS.

Last year determinations were made on the amount of water used by crops of wheat, barley, oats and peas. The work has been continued this year, and for the purpose of comparison both seasons' results are given.

Table VIII. Showing rainfall and depth of water in inches used by crops during a dry growing season, 1905.

Crop.	Depth of rain while crop was growing.	Depth of water added.	Total depth of water used by crops.	Total depth compared with rainfall.
Wheat	10.51	12.09	22.60	2.15
Peas	12.50	14.88	27.38	2.19
Barley........................	7.91	10.61	18.52	2.24
Oats........................	7.91	13.24	21.15	2.57

Table IX. Showing rainfall and depth of water in inches used by crops during a wet growing season, 1906.

Crops.	Depth of rain while crop was growing.	Depth lost by drainage.	Depth of water added.	Net depth of water used by crops.	Total depth compared with rainfall.
Wheat	12.62	1.00	5.00	17.32	1.38
Peas	12.62	1.00	6.00	18.32	1.45
Barley	12.62	1.00	6.50	18.82	1.49
Oats	12.62	1.00	6.25	18.57	1.47

From table VIII. it will be seen that during the dry growing season of 1905 all these crops used about 2.25 times as much rain as fell. Table IX. shows, however, that during a wet season the ratio of the water used to the rain during growth is only about 1.5, as against 2.25 in a dry season. Table IX. also shows that this season some of the rain was lost by percolation. These points emphasize the advantage of proper tillage and proper drainage, both of which operations improve the soil conditions, thus enabling it the better to store and conserve the vast amounts of water necessary for the crop in a dry season, and to rid itself of the surplus in a wet one.

TREATMENT OF PEAT SOILS.

The work upon this subject was a continuation of that begun last year on soil sent us by Mr. J. H. S. Cronk, Woodstock. The soil was of a very pronounced peat type, containing 84.68 per cent. vegetable matter, dry weight. It had a high water holding capacity: 100 grams of the soil in autumn field conditions lost 59.6 grams of water in drying, i.e., the soil was 59.6 per cent. water. Yet Mr. Cronk complained that during the growing season it was usually too dry.

Last year we grew oats on this soil under the following treatments:

I.—Natural soil, packed.
II.—Loam added in following proportions:
5 lbs. loam to 15 lbs. peat = 150 tons loam per acre.
10 “ “ 15 “ “ = 300 “ “
15 “ “ 15 “ “ = 450 “ “
20 “ “ 10 “ “ = 600 “ “
30 “ “ 10 “ “ = 900 “ “
III.—Lime added in following proportions:
1 lime to 20 peat = 29 tons per acre.
2 “ 18 “ = 58 “ “
IV.—Sand added in following proportions:
5 sand to 20 peat = 150 tons sand per acre.
15 “ 15 “ = 450 “ “

25 per cent. loam and 20 per cent. sand gave the best results last year and lime the poorest results, even poorer than the natural peat.

But I was not satisfied to accept the result of last year as conclusive, and kept some of the same mixtures of soil for further tests this year, also adding some others. The treatments tested this year were as follows:

Number on crock.	Treatment.	Remarks.
1	Natural peat, packed.	Same soil as used packed last year.
2	10 lbs. loam to 15 lbs. peat = 300 tons loam per acre.	One of the mixtures used last year.
3	15 lbs. loam to 15 lbs. peat = 450 tons loam per acre.	One of the mixtures used last year.
4	1 lb. lime to 20 lbs. peat = 29 tons lime per acre.	Same mixture as last year.
5	Lime added to peat at rate of 6 tons per acre.	A fresh mixture, lime standing in dry room since last year.
6	5 lbs. sand to 20 lbs. peat = 150 tons sand per acre.	Same mixture as last year.
7	15 lbs. sand to 15 lbs. peat = 450 tons per acre.	Same mixture as last year.
8	Marl added to peat at rate of 10 tons per acre.	New mixture.
9	Marl added to peat at rate of 5 tons per acre.	New mixture.

50 grains of oats were planted in each crock on May 6th. Observations were made on the germination in the various crocks on May 12th, and finally again on May 18th. The following table shows the result:

Table X. Showing Germination in Peat Soil under different treatments.

Number of crock and treatment.	Per cent. of seeds germinated by May 12, 1906.	Per cent. of seeds germinated by May 18, 1906.	Germination in 1905.
1. Natural peat	62	68	72
2. Loam, 300 tons per acre	54	62	94
3. Loam, 450 tons per acre	68	68	98
4. Lime, 29 tons per acre, old mixture	62	70	58
5. Lime, 6 tons per acre, new mixture	34	38	....
6. Sand, 150 tons per acre	60	60	94
7. Sand, 450 tons per acre	46	54	92
8. Marl, 10 tons per acre	44	46	....
9. Marl, 5 tons per acre	50	54	....

Comparing the 1906 germination with that of 1905, we must conclude that the seed was not as good as last year; but there are some resemblances between the two seasons' results worth noticing: (*a*). Lime freshly added to the soil in the spring just before seeding is very injurious to germination, for both last year and this year the soil containing freshly added lime gave the porest germination of all. (*b*). This injury disappears in the second season: e.g., crock 4, an old mixture of lime gave the highest germination of all this year. (*c*). Loam has been slightly beneficial to germination in both years. (*d*). Sand aided germination last year, but did not this year.

From time to time throughout the season, the crocks were examined, that which appeared the best at the time being taken as standard and rated at 100, the others being graded by it in order of merit. The same plan was followed for the grain and straw production. These data, together with the stooling properties and average height, are given in the following table:

Table XI. Comparison of results from different treatments of Peat. ...

Number of crock and treatment.	Appearance during season.					Producing Properties.			Stooling properties.			Average height.
	May 23.	June 1.	June 15.	July 5.	July 28.	Grain.	Straw.	Total.	Seeds germinated.	Heads harvested.	Per cent. increase.	
1. Natural peat	80	90	100	78	70	49.5	90.2	79.2	34	52	52.8	29 in.
2. Loam, 300 tons per acre .	85	85	85	90	90	100.0	100.0	100.0	31	47	51.6	36 in.
3. Loam, 450 " " " .	85	88	85	95	100	86.5	88.6	87.5	34	62	82.4	32 in.
4. Lime, 29 " " " .	100	100	95	100	95	95.0	85.4	87.5	35	49	40.0	30 in.
5. Lime, 6 " " " .	60	50	50	50	50	77.4	63.4	66.7	19	24	26.2	30 in.
6. Sand, 150 " " " .	90	72	70	65	56	36.7	72.0	62.5	30	41	36.6	32 in.
7. Sand, 450 " " " .	75	65	68	65	60	59.8	86.4	79.2	27	45	66.6	31 in.
8. Marl, 10 " " " .	35	65	56	55	58	65.8	56.0	58.3	23	30	26.6	26 in.
9. Marl, 6 " " " .	25	60	60	65	60	52.9	83.2	75.0	27	36	33.3	31 in.

From this table the following facts may be gleaned: (1). Peat treated with a moderate application of loam gave the best yield in both grain and straw. (2). The old mixture of lime and peat gave the thriftiest looking plants throughout the season, but was second in yield of grain, and fourth in yield of straw, second in total yield. (3). With fresh lime, although the germination and appearance were poor, the yield of grain from it is fourth on the list. (4). The natural peat gave the second lowest yield of grain, but the second highest yield of straw. (5). Marl increased the grain production. (6). Sand does not seem especially beneficial. (7). Marl appears to act somewhat like fresh lime. (8). Lime should be added in the autumn rather than in the spring just before seeding.

SOIL ANALYSIS.

During the summer twenty samples of soil from the Rittenhouse Farm were sent us by Mr. A. B. Cutting for analysis. The results are given in the following table:

Table XII. Complete Analysis of 20 samples of soil from the Rittenhouse Farm.

Sample.	Per cent. of coarse gravel.	Per cent. of fine gravel.	Per cent. of coarse sand.	Per cent. of medium sand.	Per cent. of fine sand.	Per cent. of very fine sand.	Per cent. of silt.	Per cent. of clay.	Per cent. of organic matter.	Class.
1	.59	.088	.640	.712	.716	54.098	38.674	5.000	3.736	Loam.
2	0.00	2.023	1.812	1.431	.980	61.074	31.404	1.264	....	Sandy loam.
3	1.64	.724	1.111	1.378	.721	50.713	36.612	8.733	4.988	Loam.
4	1.07	.600	.819	1.310	.927	21.972	53.242	21.107	....	Clay.
5	0.00	.127	.426	.684	1.734	38.947	43.636	14.420	4.812	Loam.
6	.63	.187	.934	1.230	1.314	36.952	38.901	21.462	....	Clay loam.
7	10.83	4.314	3.182	1.248	1.624	22.081	45.202	22.927	9.260	Clay loam.
8	6.94	1.033	1.771	.953	1.647	9.187	38.227	47.167	....	Clay.
9	.95	.392	.741	.764	1.435	53.115	44.400	9.136	6.112	Loam.
10	3.65	5.181	3.799	2.983	4.022	18.000	43.336	22.690	....	Clay loam.
11	10.79	5.036	2.414	2.916	9.31	9.017	38.500	38.182	8.330	Clay loam.
12	1.71	.042	.501	.447	.312	8.977	62.308	27.404	....	Heavy clay.
13	3.39	.090	.517	.744	.984	40.852	40.656	16.148	7.916	Loam.
14	8.43	1.008	3.747	.932	.873	31.291	57.052	6.087	....	Loam.
15	1.79	.078	.731	.862	.898	38.617	49.671	9.135	6.276	Loam.
16	.43	.036	.284	.654	1.722	32.693	49.688	14.912	....	Loam.
17	1.20	.094	.320	.798	1.246	54.522	39.640	3.376	4.966	Loam.
18	.37	.026	.418	.424	.888	74.735	22.736	.770	....	Sandy loam.
19	1.84	.042	.546	.410	.922	63.654	32.744	2.471	3.85	Sandy loam.
20	1.11	.038	.628	.764	1.317	57.336	38.492	1.420	....	Sandy loam.

Odd numbers are surface soils ; even numbers are sub-soils of preceding surface soils.

Summary.

	Surface soils.	Subsoils.
Sandy loam	1	3
Loam	7	2
Clay loam	2	2
Clay	0	2
Heavy clay	0	1

A number of soils have been analyzed for Professor Reynolds also, in connection with his investigations in the growing of tobacco. The results of these analyses will no doubt appear in his report.

Aeration of Soils.

It is well known that air in the soil is essential to the growth of plants. Last year and this year we have conducted a series of experiments to ascertain whether the aeration brought about by proper tillage and drainage is sufficient for the best results in crop production. Four gallon crocks, the same as used for transpiration and experiments with peat soils, were used for this purpose. Wheat, barley, oats, peas, were used last year. This year alfalfa and soja beans were used in addition, four crocks of each. Through two of each kind air was forced once a day, effecting a complete change of air in the soil. The other two were not given any artificial aeration. Last year no marked benefit from the aeration was noticed in the wheat, barley, and oats. The peas, however, were very much benefited; and they were kept and sowed again this year. The following table gives a summary of the information regarding the wheat, barley, oats, and peas:

Table XIII. Comparing Growth of Crops in Soil Aerated Naturally and in Soil given Additional Aeration.

Number of crocks and kind of grain.	Remarks as to seed.	How treated.	Grains planted.	Grains germinated.	Plants at harvest.	Production.			
						Weight of grain in ounces.	Weight of straw in ounces.	Total crop in ounces.	Average height in inches.
10 Wheat.	Seed from field crop of 1905.	Aerated. ...	50	35	41	3.1	30.6	33.7	38
12 Wheat.	"	Aerated	50	33	42	8.0	32.7	40.7	38
13 Wheat.	"	Not aerated.	50	29	38	11.2	34.9	46.1	35
15 Wheat.	"	Not aerated.	50	36	41	9.2	31.6	40.7	53
16 Barley.	"	Aerated.....	50	42	45	14.3	28.2	42.5	27
18 Barley.	"	Aerated,....	50	40	45	14.8	27.7	42.5	27
19 Barley.	"	Not aerated.	50	37	46	16.9	25.6	42.5	26
21 Barley.	"	Not aerated.	50	37	43	16.9	29.0	45.9	27
22 Oats...	"	Aerated.....	50	36	52	14.2	26.6	40.8	28
24 Oats...	"	Aerated.....	50	31	44	12.4	24.8	37.2	31
25 Oats...	"	Not aerated.	50	33	45	13.8	23.4	37.2	33
27 Oats...	"	Not aerated.	50	34	47	10.4	26.8	37.2	......
28 Peas...	"	Aerated.....	50	16	15	2.6	18.7	21.3	......
30 Peas...	"	Aerated.....	50	13	10	4.2	17.1	21.3	......
31 Peas...	"	Not aerated.	50	17	14	2.6	16.9	19.5	.....
33 Peas...	"	Not aerated.	50	12	9	3.1	19.9	23.0	......
34 Peas...	Seed from aerated crock of 1905....................	Aerated.....	25	16	14	8.3	23.6	31.9	......
36 Peas...		Aerated.....	25	15	11	7.3	19.3	26.6	.....
37 Peas...	Seed from unaerated crocks of 1905......	Not aerated.	25	15	13	3.2	19.9	23.1	......
39 Peas...		Not aerated.	25	16	12	4.6	18.4	23.0	.....
58 Peas...	Seed from field crop of 1905.	Aerated.....	24 plants growing in each crock.		23	5.5	33.5	39.0	......
60 Peas...		Areated.....			17	3.0	33.7	33.7	......
61 Peas...		Not aerated.			19	5.4	26.2	31.9	......
63 Peas...		Not aerated.			18	2.6	18.7	21.3	......

The same number of plants left in all crocks to test growth.

From this table it will be seen that this year the aerated wheat and barley did not seem to do quite as well as the unaerated. Last year the aerated had a slight advantage. The aerated oats yielded slightly better than the unaerated—the same as last year. The aerated peas yielded slightly better than the unaerated, but the difference was not so marked as last year. On the whole, the aeration seemed less effective this year than last, a result possibly due to the fact that the frequent rains this season produced great natural aeration in all crocks. A fact of special interest is to be found in comparing crocks 34 and 36 with 37 and 39. The former were planted with seed from last year's *aerated* crocks, the latter with seed from last year's *unaerated* crocks, and 34 and 36 gave just double the yield given by 37 and 39. Not only so: 34 and 36 gave nearly double the yield given by any other group of two. It will be interesting to follow this point for a few years to ascertain if aeration gives the grains a vitality that is transmitted from crop to crop. If this be the case, it opens up possibilities of an entirely new method of seed improvement.

The soja beans and alfalfa did not reach maturity, but the beneficial effect of increased aeration upon them was very noticeable.

DAMAGE BY LIGHTNING IN 1906.

Records of damage by lightning have been kept since 1901; in no previous year has the number of lightning strokes reported been as great. Tables Nos. XIV-XVIII give the numbers of buildings, animals, and trees struck in 1906; also summaries for the years 1901-1906.

Table XIV. Buildings Struck in 1906.

	Barns.				Other buildings.			
How Reported.	Burned	Damaged	Totals	Loss	Burned	Damaged	Totals	Loss
Personally reported......	32	15	47	$67,049	1	17	18	$1,906
Reports from newspapers.	27	3	30	26,000 (8 barns)	1	22	23	
Totals.........	59	18	77	93,049	2	39	41	1,906

Note.—Loss reported on 55 barns.....................	$93,049	
Loss on 77 barns at same rate..............................		$130,269
Loss reported on 18 houses....................	1,906	
Loss on 41 houses at same rate..............................		4,340
Total loss on buildihgs reported		$134,609

Table XV. Summary of Buildings Struck from 1901-1906.

Year.	Personally reported.		Reported from all sources.			Extent of loss.		Rodded buildings.	
	Barns	Others	Barns	Others	Totals	Burned	Damaged	Burned	Damaged
1901	26	6	26	6	32	15	17	3	1
1902	34	14	39	19	58	11	47	..	3
1903	18	5	24	8	32	16	16	..	2
1904	20	5	62	19	81	54	27	..	..
1905	23	11	28	14	42	26	16	..	..
1906	47	18	77	41	118	59 barns 2 houses	18 barns 39 houses	1	1
Totals	142	53	256	107	363	183	180	4	7
	195		363			363		11	

Table. XVI. Animals Struck.

Animals	In field.	By fence.	Under tree.	In or near building	Totals.						
					1906	1905	1904	1903	1902	1901	Six years.
Cattle ..	30	1	33	15	79	19	32	8	22	33	193
Sheep ..	15	17	5	3	67	......	9	1	47	7	131
Horses..	7	....	....	8	15	8	8	2	17	11	61
Pigs....	....	....	....	8	8	......	....	......	3	1	12
Totals	52	18	38	34	169	27	49	11	89	52	397

Table XVII. Summary of Trees Struck from 1901-1906.

Year.	Elm.	Pine.	Oak.	Basswood.	Maple.	Ash.	Poplar.	Cedar.	Apple.	Hemlock.	Willow.	Spruce.	Beech.	Chestnut.	Balsam.	Hickory.	Butternut.	Fir.	Birch.	Walnut.	Pear.	Total.
1901............	7	8	1	5	2	..	..	..	..	2	..	..	..	1	..	..	..	..	..	..	..	26
1902............	6	1	5	2	4	2	1	..	..	..	1	..	1	..	1	1	..	..	..	..	..	25
1903............	5	3	1	..	..	1	1	..	1	..	1	..	..	..	..	..	..	..	..	..	..	13
1904............	6	4	1	..	..	1	2	..	2	..	..	..	..	..	..	..	1	..	..	..	..	17
1905............	4	1	1	..	1	..	..	3	..	..	..	1	..	..	..	..	..	1	..	..	..	13
1906............	7	5	6	..	3	..	2	1	5	2	3	2	..	1	2	..	..	..	2	1	1	43
Totals	35	22	15	7	10	4	6	4	8	4	5	3	1	2	3	1	1	1	2	1	1	137

It will be observed that the number of buildings struck this year is nearly one-half greater than in any other year; the number of animals more than three times as great; and the number of trees nearly twice as great.

We do not claim that these reports are complete; but we believe the information collected in these cases represents pretty well the conditions throughout the Province. If the loss on the buildings reported amounts to $135,000, as shown in note to Table No. XIV, we may conclude that complete records would show a loss for the Province of probably twice this amount, or roughly speaking, of a quarter of a million dollars. In view of this enormous loss, it is not strange that farmers are showing renewed interest in the question as to whether lightning rods are of any protective value. In Table No. XV. will be found two columns "Burned" and "Damaged" under the heading "Extent of Loss," and also the same two columns under the heading "Rodded Buildings." It will be observed that almost exactly *half* of all buildings struck were burned, the other half only damaged. But of the rodded buildings, only *one-third* were burned. This would seem to indicate that when a rodded building is struck it is less likely to be burned than an unrodded one is when it is struck, the extra safety of the rodded one being represented by the difference between ½ and 1-3, *i.e.*, 1-6 or 16 2-3 per cent. But scientists believe that the value of rods is not confined to the saving of 1-6 of the few rodded buildings struck: They believe that the rods actually prevent buildings from being struck; and the laws of electricity do certainly point to such a result, but this has not been directly established, nor yet has it been disproved. Refer to Table No. XV.: we see that 195 buildings have been "personally reported." Of these 195 we know 11 were rodded, or 5.6 per cent. This may, I think, be fairly taken to represent the percentage of rodded barns among those struck. Now what percentage of the buildings in Ontario are rodded? Is it exactly 5.6 per cent.? If it is, then the rods neither prevent nor induce strokes. Is it only 1 per cent.? If it is, then the rods are positively dangerous. Is it 11.2 per cent.? If it is, then the rods are a great protection. Or, generally speaking, if the percentage of rodded buildings in Ontario is less than 5.6, then rods are dangerous; but if it is greater than 5.6, then the rods have a protective value. In October of this year, while travelling from Guelph to Parkhill by G.T.R., I endeavored to gain some idea of the proportion of rodded barns by counting the rodded and unrodded ones along the way. The result was most surprising to me. There were 422 barns close enough to the track for me to distinguish whether they were rodded or not; and of these 160, or 38 per cent., were rodded! But more surprising still, I saw only 3 rodded barns in a drive of ten miles north from Parkhill through a densely settled district. With such variations it was impossible to base upon these observations any argument as to the protective value of lightning rods, and efforts are now being made to arrive at a systematic estimate of the number of rodded and unrodded buildings throughout the entire Province. When we are able to state definitely whether the number of rodded barns in Ontario is less than, equal to, or greater than 5.6 per cent., we shall have established directly whether rods are dangerous, neutral, or protective.

Not only has the loss in buildings and live stock been great, but the number of persons killed or stunned has been very high, 15 killed and 17 stunned. The occupations of the 15 killed were as follows: Standing in doorway, 3; under tree, 2; working in field, 2; under hay stack, 1; under shed, 1; carrying pitchfork, 1; in cellar, 1; sitting in home, 1; leaning against barn, 1; sleeping in bed, 1; standing below chimney, 1. Some of those stunned were occupied as follows: Sitting by stove, 2; on telephone pole, 1; at telephone, 1; in yacht on lake, 3 (all in one yacht); in river, 1; feeding horses, 1; standing by windmill, 1. In the majority of cases those struck were either in or near buildings or near other elevated objects.

Several cases have been reported this year of lightning striking the same building twice; and in one case a barn was struck three times, and still escaped destruction.

Before concluding my report I would like to acknowledge the very able assistance rendered by Mr. Thom in all the foregoing work.

Respectfully submitted,

WM. H. DAY.

PART V.

THE PROFESSOR OF BOTANY.

To the President of the Ontario Agricultural College:

SIR,—I herewith submit my report of the Botanical department.

The report will be necessarily brief, as there has been a complete remanning of the work, and the organization in some respects is still incomplete.

The former instructors have scattered widely. Professor Lochhead, after eight years of faithful service, left in April to go to the new Macdonald College at Ste. Anne de Bellevue, Quebec, as Professor of Biology. For the first seven years he had charge of both Botany and Entomology, and assisted in the later years very materially in the Nature Study work not only of the Macdonald Institute, but throughout the Province at teachers' associations. By his open, generous nature, ready sympathy, sound pedagogic views and readiness to help, he was a large factor in educational advancement in Ontario along practical lines. His work in Quebec and the Maritime Provinces cannot but be for their betterment, and our best wishes go with him. Mr. V. W. Jackson, B.A., left in the Spring to assume charge of a position under the Auckland (New Zealand) Board of Education. His selection to the position reflects great credit on Mr. Jackson as well as on the College, for it was advertised in England as well as Canada. His work is directing and instructing the teachers in elementary Agriculture and Nature Study throughout the schools of the province. Mr. E. Thompstone, B.Sc., left in June to take charge of the Deputy Directorship of Agriculture for the Province of Bombay, India. He was appointed by the India Office in London, and is stationed at Poona in the Deccan.

The new staff consists of Messrs. Eastham and Howitt and myself. I assumed charge in August, but for this term have had to give most of my attention to the Nature Study class at Macdonald Institute.

Mr. J. W. Eastham, B.Sc., is a graduate of the Agricultural Department of Edinburgh University, and has had four years' experience in teaching in the Cheshire Agricultural College at Holmes Chapel.

Mr. J. E. Howitt, B.Sc., is a graduate of this College, of the year 1905, and has had a year's post-graduate work in Cornell University, Ithaca, N. Y. Both gentlemen are very well equipped for their work. Up to the present, Mr. Howitt has had charge of the general botany of the first and second years, Mr. Eastham assisting, while the Cryptogamic Botany of the third year is in Mr. Eastham's hands. Mr. Howitt has charge of the laboratory Phsyiology, while I take the lecture work. In Plant Pathology we have had the good services of Mr. Jarvis of the Entomological department.

There has been the usual correspondence regarding weeds, weed seeds and plant diseases. In June, during the Farmers' Excursions, the Information Bureau was in charge of Mr. Thompstone and Mr. Baker.

There are no special needs to mention that have not been previously brought to your notice. We expect to get more microscopes and teaching charts next year, and look forward too to having a greenhouse added to our equipment for Plant Physiology. It would seem that the day is not far distant when the laboratories will have to be enlarged.

Respectfully submitted,
S. B. McCREADY.

PART VI.

THE PROFESSOR OF ENTOMOLOGY AND ZOOLOGY.

To the President of the Ontario Agricultural College.

Sir,—I have the honor to present my first report for the Department of Entomology and Zoology. As my appointment to the Professorship, rendered vacant by the resignation of Professor Sherman, dated from the first of June last, I have only the proceedings of the last six months to report upon. During the summer months my time was fully occupied with field observations, the collection of specimens for the cabinets and for study, and a somewhat voluminous correspondence.

In June there were many visitors during the Farmers' Excursions who brought specimens for identification and who desired information regarding the best methods of dealing with various noxious insects. In July I spent several mornings and many afternoons with the Nature Study Class of Ontario teachers at the Macdonald Institute, assisting them in naming and classifying their collections of insects and directing some out-door observations. During August and at the beginning of September a good deal of time was taken up in preparation for the removal of the library and collections of the Entomological Society of Ontario from London to Guelph, and their subsequent re-arrangement in the College library and museum here. On the 17th of September the regular work of the term began and the prescribed course of lectures has since been fully carried out.

Course of Instruction.

From information supplied by my colleague, Mr. Tennyson D. Jarvis, B.S.A., I am enabled to give a complete account of the educational work that has been done in this Department during the whole year, the instruction during the winter term having been given by Prof. Sherman and Mr. Jarvis, and in the current term by Mr. Jarvis and myself.

1. *Elementary Zoology.*—First year, winter term, two periods of lectures and one of laboratory work each week, covering the chief divisions of the animal kingdom and their principal characteristics, special attention being given to the species common in this country and those of economic importance as regards agriculture and horticulture.

2. *Economic Entomology.*—Second year, fall term, two periods of lectures and one afternoon of laboratory work each week. This course has afforded instruction in the external anatomy and structure of insects, their metamorphoses and life-histories, and an outline of their classification. Special attention has been given to those affecting farm, garden and orchard crops, and those of a beneficial character, and to insecticides and other methods of dealing with noxious species. From time to time the lectures have been illustrated with lantern pictures, enabling the whole of a large class of students to see details of form, structure, ornamentation, etc., which could not otherwise be conveniently brought before them. During several weeks at the beginning of term an afternoon was spent in field excursions for collecting specimens and making observations, but when the weather became too inclement for out-door work of this kind the time was devoted to laboratory work.

3. *Systematic and Economic Entomology.*—Third year, both winter and fall terms, two periods of lectures and one afternoon of laboratory work each week. This may be regarded as the most important course in entomology during a student's College career. A systematic series of lectures is begun in September and carried through both terms. The division of the class of insects into orders is first treated of and their characteristics described. Each order is then dealt with in turn, and the general classification into super-families, families and tribes is carefully taught; the more important genera and species are taken up in detail and much attention is paid to the life-histories of common forms and those of economic importance. During the term now drawing to a close the orders Orthoptera, Hymenoptera, Coleoptera and Lepidoptera have been particularly studied; the remaining orders will be taken up after the Christmas vacation and more careful study will be made of structure and other details of families which have not been fully discussed already. The lectures are illustrated with diagrams and specimens, and occasionally by a series of lantern pictures of the more important insects belonging to the order under consideration. It is expected that by the end of the College year the students in this class will have acquired a sufficient knowledge of general entomology to be able to know at sight to what order and family any common insect belongs, whether it is noxious, beneficial or harmless, and, if of a destructive character, how best to deal with it. A knowledge of this kind cannot fail to be of immense benefit to all who intend to devote themselves to horticulture or agriculture in any of their branches. Some members of the class, whose tastes lead them to take a keener interest in biological pursuits, will be encouraged to form collections for themselves and study more in detail and in a scientific manner the specimens that they are able to obtain. They will thus be prepared in their fourth year to specialize in Biology or Horticulture with the advantage of a good foundation in, at any rate, the Entomological portion of their studies. The laboratory work in the afternoons, since the field excursions had to be abandoned for the season, has been devoted to the examination and study of specimens in order to learn their characteristics from actual examples and thus be enabled to place them in the order and family to which they belong, and become familiar with their general aspect.

4. *General Entomology.*—Fourth year, both winter and fall terms, six hours of laboratory work per week. This course is for those students who take the Biological or Horticultural options in the College curriculum. The work is of a much more advanced character than that of the preceding years, and includes careful field observations as long as the weather permits, studying life-histories, making collections in special departments and doing systematic work in the determination of specimens. Under the supervision of Mr. Jarvis, microscopic work is carried out in the study of gall-insects, scales, and the minute forms of great economic importance. Some valuable original observations have been made in the field and garden by students in this year which have been deemed worthy of publication in scientific periodicals or bulletins.

5. *Systematic and Economic Zoology.*—Fourth year, one afternoon each week in laboratory work during the fall term and two afternoons in the winter term.

The fourth year specialists in Biology receive lectures in laboratory and field work. In the laboratory representative species are examined with special reference to parts employed in classification. In the lectures are discussed the principles of classification and the characters and relationships of groups, and the habits and life histories of the economic species. In the field are studied the appearance and habits of the economic forms of animal life.

6. *Vertebrate Histology.*—In this course the students specializing in Biology receive lectures and demonstrations on the gross anatomy and the microscopic structure of the vertebrates. Especial attention is given to the methods of staining, imbedding and sectioning animal tissues. The material equipment consists of microscopes, camera lucidas, microtomes, photo-micrographic camera and the projection microscope which is available for class demonstrations.

7. *Insect Histology.*—This course accompanies the course on vertebrate histology. Lectures and demonstrations are given on the anatomy and histology of the insect. Especial attention is given to the study of the mouth parts and the respiratory system.

8. *Physiology.*—The fourth year specialists in Biology receive lectures and demonstrations on elementary and experimental physiology of the human body.

9. *Nature Study.*—The class of Nature Study students from the Macdonald Institute, consisting of teachers from the eastern Provinces of the Dominion, has come to me for one afternoon in each week during the fall term. A series of lectures has been given to them on the outlines of Entomology, discussing the general classification and that of the more important orders of insects. Special attention has been given to common species that are of economic importance or of particular interest from their remarkable life-histories, and to those that are to be met with almost everywhere and thus attract the notice of school children and the casual observer. The lectures have been illustrated with numbers of specimens and occasionally with lantern views. The members of the class are keenly interested in their work, and it has been a pleasure to assist them in the acquisition of a knowledge of some portion of this wide field of nature study.

10. In addition to the foregoing, I gave, in Massey Hall, a lecture illustrated with lantern pictures on "Some Injurious Insects" to the Associations of Oxford and Bruce teachers who met here on the 31st of May and 1st of June. On the 30th of August a paper prepared by Mr. Jarvis on "Greenhouse Pests" was presented by me at the meeting of the Florists' Association of Canada. On the 12th of September we both took part in judging the Natural History exhibits at the Guelph Central Fair and in examining orally the children who were competitors for prizes. On the 21st of November I gave an address to the Farmers' Institute lecturers on some of the most important injurious insects.

On the 4th of June Mr. Jarvis gave two lectures in Toronto to the Farmers' Institute Lecturers on "Insects injurious to Staple Crops and Garden Crops," and on "Fungus Diseases affecting Cereal Crops"; and on the evening of the same day an illustrated lantern lecture to the boys of the Broadview Institute on Life-histories and Habits of Insects.

CORRESPONDENCE.

There have been constant enquiries all through the season and even up to the present time, respecting a variety of injurious insects and the best methods of dealing with them. Letters asking for information have come from all parts of the Province of Ontario and some from such distant localities as British Columbia and Nova Scotia. These all received careful attention and were fully replied to; in some cases, where obscure forms or little-known insects were sent for information, it was necessary to devote to them a good deal of time and attention as well as research.

The following are some of the insects about which enquiries were made and which attracted notice from their ravages and widespread abundance.

The Oyster-shell Bark-louse (*Mytilaspis pomorum*) is now generally distributed on apple and other trees throughout the Province, especially in old and neglected orchards. Specimens have been sent for identification from many parts of the country ranging from Georgian Bay to Lake Erie and from the County of Durham to the River St. Clair. It is to be found, no doubt, in every county, if not township, of the Province. While it does not multiply and spread with the rapidity of the San Jose scale and is therefore not so destructive, it is nevertheless a serious injury to the trees, where it is allowed to encrust the limbs and twigs, and should by no means be neglected. The lime and sulphur wash has been found most effective.

The Rose-beetle, or Rose-chafer (*Macrodactylus subspinosus*) appeared in great numbers this year in various localities where it had not been observed before. Specimens were sent from the outskirts of Toronto, which seems to be its present eastern limit, and from places here and there as far as the County of Essex. It has been abundant at London for some years past, but does not appear to extend much farther north. As the larva lives upon the roots of grasses on sandy land, the most effective remedy is to break up old pastures where the beetle occurs, especially as the ordinary insecticides have little or no effect upon the adult insect.

White-grubs, the larvæ of May-beetles or "June-bugs" (*Lachnosterna*) have been very destructive to lawns and boulevards in cities and towns, and to the turf of golf-links and bowling-greens. In some cases the grubs have eaten away the roots of the grass to such an extent that the sod could be rolled up like a carpet. Complaints were also made of injury to strawberry plants by the grubs devouring the roots.

Specimens of the Spruce Gall Mite (*Chermes abietis*) have been sent in from Milton, Galt, Chatham and Shelburne. It is also to be found in abundance on some spruce trees in the College campus, and is widespread throughout the Province, causing no little anxiety to nurserymen and owners of ornamental shrubbery. We hope to carry out a series of observations and experiments with it during the coming year.

The White-marked Tussock Moth (*Orgyia leucostigma*) has been abundant as usual in Toronto and some other cities and several enquiries have been made respecting it. Where the conspicuous egg-masses have been regularly removed from the trees in the winter time, the insect is easily kept within due bounds and does no appreciable injury to the shade or fruit trees that it affects.

The Cottony Maple-scale (*Pulvinaria innumerabilis*) is another shade-tree insect that has been alarmingly abundant on Maples, Bass-wood and other trees in the streets of London and several other places. After a series of years during which its attacks have been more and more severe, the insect is now, happily, on the wane, owing, no doubt, to the increase of its parasitic enemies. This year it has been far less numerous than for many years past and will probably not give much trouble for some time to come. The scale was to be found on some trees in the woods here, but nearly all that were examined were killed by parasites and only a very small percentage remained alive.

Enquiries respecting the San Jose scale (*Aspidiotus perniciosus*) were made from some of the affected districts, and information was given regarding the lime-sulphur method of treatment.

Galls on Maple and other trees were sent in from several quarters. Mr. Jarvis has been for some time making a special study of these interesting growths and the insects that cause them. The results will shortly be published in an accessible form.

The Mediterranean Flour-moth (*Ephestia Kuhniella*) has given a great deal of trouble and caused much anxiety to the owners of an infested building at Lambton Mills. Energetic measures have been taken to get rid of the pest with satisfactory results.

The Buffalo Carpet-beetle (*Anthrenus scrophulariæ*) has been sent in for identification and information by housekeepers in many places, showing that it is now to be found all over the Province and has to be reckoned with amongst the domestic plagues that require constant vigilance.

The Asparagus beetles (*Crioceris asparagi* and *12-punctatus*) are gradually spreading in a north-west and westerly direction from the Niagara River, where they crossed into Canada, and are now to be found in injurious numbers as far as Guelph and London. The former species, called the Blue Asparagus beetle, has not advanced so rapidly as the spotted form, but both are now numerous in the College garden and elsewhere, the larvæ of the one feeding upon the foliage and of the other on the seeds of the plants. Both species may be found attacking the shoots when the vegetable is being cut for table use.

Aphis, or Plant-lice, affecting Cabbage, Turnip, Fruit-trees, Honeysuckle and other ornamental plants, have been frequent objects of enquiry throughout the season, also the Onion and Turnip maggots, Cut-worms, Cucumber-beetles, Wire-worms, the Tarnished and Four-lined Leaf-bugs and many other insects troublesome to gardens.

The Clover-seed Midge (*Cecidomyia leguminicola*) has been troublesome at Simcoe, and the Bean-weevil (*Bruchus obtectus*) at Aurora. The Pea-weevil (*Bruchus pisorum*) is not nearly so abundant as in former years but should not on that account be neglected. These two "weevils" can be controlled without much difficulty by fumigating with bi-sulphide of carbon.

Many other insects of lesser note, or rather of less widespread notoriety, have been sent in on account of their injuries to green-house plants, fruit-trees, vegetables and flowers, etc. Some account of these and of the remedies recommended in the case of the insects mentioned here will be given in the forthcoming Annual Report of the Entomological Society of Ontario.

Some correspondence has also been carried on with leading Entomologists in the United States regarding the introduction of parasites to keep in check the ravages of the Codling worm. Any definite results obtained will be reported upon in due course.

In addition to the correspondence on injurious insects, a considerable amount of time has been occupied with the identification of collections of insects. No less than twenty-two cases or boxes of specimens were named during September for school children in Guelph and the neighbourhood and some more distant places. Many specimens of a more interesting scientific character were also studied and reported upon for Entomological students in other places. We are always pleased to be of assistance in this way to anyone interested in Entomology.

DEMONSTRATIONS.

A number of demonstrations were given by the department at fall fairs and Fruit and Flower shows in the cities and towns, which if systematically persisted in cannot fail, we feel sure, to give some much-needed assistance to the farmer and fruit-grower along the lines of economic biology.

At each place attended an information bureau was installed and the most important phases of biology, from an economic standpoint, were illustrated by an exhibition. Specimens and series illustrating the life-histories of many of our common injurious insects, as San Jose scale, Spruce Gall-louse, Wireworms, June beetles, Codling moth, Tussock moth, Plum curculio, Buffalo tree-hopper, Pear tree slug, and many others, were shown in patent Ricker mounts so that they could be safely handled and examined. In the same way our more important diseases of farm and garden crops as the smuts of corn, wheat, oats and barley, wheat rust, potato blight, shot-hole fungus of plum, anthracnose of bean, black knot of cherry and plum, apple canker, black rot of grapes, plum pockets, apple and pear scab, and many other common fungous diseases were exhibited.

Insecticides and fungicides made up in small quantities were also shown and instructions for their manufacture and use given to all interested. Apparatus for the fumigation of nursery stock was also shown and its use explained.

In the line of Nature Study demonstrations were given in the collecting, mounting and preservation of insects and in the preservation of other zoological specimens as frogs, snakes, birds, etc., and examples of the preservation of these shown.

Demonstrations in the setting up and preservation of aquaria were also given and several aquaria containing living specimens exhibited.

At all of these exhibitions efforts were made to assist farmers and others to whom the information would be of value by an interesting and attractive exhibition and by giving all possible assistance to interested parties. By this method it is hoped that the farmer may be induced to take a deeper interest in one of the most important phases of Agriculture—Economic Entomology.

The demonstrations were given by Mr. Jarvis at the following places:

Aug. 26th to Sept. 10th. Natural History Building, Toronto Exhibition, Toronto.

Sept. 11th-13th. Central Exhibition at Guelph.

Sept. 14th-15th. Fruit, Flower and Vegetable Show at St. Catharines.

Nov. 6-10th. Fruit, Flower and Vegetable and Honey Show, Massey Hall, Toronto.

Dec. 10th-14th. Winter Fair, Guelph.

PUBLICATIONS.

In addition to editing the "Canadian Entomologist" and the Annual Report of the Entomological Society to the Legislature of Ontario, I have contributed the following articles:

"Ravages of the Rose-beetle," Toronto Globe, July 21st.

"The Fall Web-worm," Guelph Herald, September.

"Fall Work against Insects," a Press Bulletin which has been published in agricultural journals and newspapers all over Ontario and in some other parts of the Dominion.

"The Codling-worm," Canadian Horticulturist, December.

"Injurious Insects of the Year," Annual Report of the Entomological Society of Ontario for 1906.

Mr. Jarvis has made the following contributions during the year:

Reports of the meetings of the Guelph Branch of the Entomological Society of Ontario.—Canadian Entomologist, February, March and April.

"Mites infesting Farm Homesteads."—Can. Entomologist, July.

"The Oyster-shell Bark-louse."—Can. Entomologist, September.

"The Locust Mite."—Can. Entomologist, October.

"The Stomach Contents of the Wood Frog."—Ontario Natural Science Bulletin.

"A Preliminary List of the Gall Insects of Ontario," and "Investigations of Clover Fertilization."—Report of the Entomological Society of Ontario for 1906.

"Wheat Rust."—Toronto Weekly Sun, June 28.

Various minor articles for the "Farmers' Advocate," London; the "Canadian Horticulturist," Toronto, and the "Western Farmers' Advocate," Winnipeg.

Joint authorship with Prof. Lochhead of O. A. College Bulletin, No. 150.

"The Common Fungus and Insect Pests of growing Vegetable Crops," published by the Department of Agriculture, July, 1906.

FIELD EXPERIMENTS.

The following are the results of the Field Experiments carried out under the supervision of Mr. Jarvis. While largely negative in character, they are of value as shewing what suggested remedies are of little or no use. The experiments have only been conducted during one season; it is intended that they shall be continued and others attempted when the proper time comes.

The Oyster-shell Bark-louse.

Owing to the large number of applicants who were desirous of obtaining information on the best methods of combating the Oyster-shell Bark-louse, it was decided to carry on a number of experiments here, to test the efficiency of the various insecticides commonly used againt scale insects.

Of all the spray mixtures tried, the well-known lime, salt and sulphur wash gave the best results.

The lime, sulphur and caustic soda, and the lime, sulphur and sal soda were also tried, but without quite such good results. The lime, sulphur and caustic soda proved to be a little superior to the lime, sulphur and sal soda, owing to its apparent power of better penetration.

Soaps.—Various soaps were also tried, and of these the Whale-oil Soap Emulsion gave the best results, many of the scales being killed.

The Whale-oil Soap gave good results also, but not equal to the Emulsion.

Sunlight and Lifebuoy soaps, and also a mixture of both, proved to be of very little value, inasmuch as they did not prevent the eggs from hatching. These soaps are claimed by the makers to be most effective against the San José and other scale insects, but applied as a winter wash against the Bark-louse they have little value. Undoubtedly they should be applied after the young lice hatch, and not as a winter application, and then would most likely prove effective against the tender lice.

Kerosene Emulsion.—Kerosene Emulsion was also tried, and this proved of more value than the Whale-oil Soap Emulsion, but not so effective as the lime, salt and sulphur wash.

Lime.—Quick slaked lime, 1½ lbs. to 1 gallon of water, proved very effective applied as a winter wash, and equalled the results obtained by the lime, salt and sulphur.

Kerosene-Lime.—This was also tried, but did not prove superior to the Kerosene Emulsion, and therefore is not to be preferred to it.

Root Maggot Experiments.

It is well known that throughout the Province of Ontario, enormous loss is occasioned to the vegetable gardeners and others from the destructive ravages of root maggots.

These insects attack in particular radishes and cabbages, also onions. In the case of radishes they tunnel through them, thus making them unfit for sale, and in the case of the cabbage they burrow beneath the ground, attacking the root and causing the plant to die.

The maggots which are found attacking cabbages, radishes, cauliflower, turnips and those in onions, and in beans and corn, are very similar, but they belong to three different species, Phorbia brassicae, attacking plants of the cabbage family; Phorbia ceparum, infesting onions, and Phorbia fusciceps, injuring beans and corn.

Up to the present time it cannot be claimed that any thoroughly efficient remedy has been discovered. Numerous remedies have from time to time been suggested, and therefore the following series of experiments was carried out to determine the best and cheapest means of eradicating this pest:—

I. Carbolic Acid Emulsion.

The emulsion was made as follows:—Hard soap, 1 lb., or soft soap, 1 quart; boiling water, 1 gallon; crude carbolic acid, 1 pint.

This stock solution was diluted with 50 parts of water and then sprayed upon rows of radishes that were just nicely above the ground. The results were as follows:—Radishes sprayed, 225; radishes free from maggots, 75; radishes infested with maggots, 150.

This is one of the best remedies for the radish maggot, but should be applied at frequent intervals throughout the growing season.

II. Pyrethrum and Flour.

This application was applied dry. Pyrethrum or insect powder was mixed with four times its weight of flour, and then kept in a tightly closed tin for twenty-four hours. After this time had expired it was taken and shaken lightly over the radishes.

The results were as follows:—Radishes treated, 286; radishes free from maggot, 197; radishes infested with maggot, 89.

It will be seen that this remedy gave excellent results.

III. Hellebore.

White Hellebore was applied as a dry application and in an undiluted state.

The results obtained were as follows:—Radishes treated, 185; radishes free from maggots, 55; radishes infested with maggots, 130.

IV. Tobacco Water.

Refuse tobacco, 2 lbs; water, 5 gallons.

This mixture was boiled for 30 minutes or more, and, when cool, was sprayed on the plants undiluted.

V. Carbon Bisulphide.

About a teaspoonful of carbon bisulphide was taken and poured into a hole made a short distance from the root of the plant. The hole was then covered with earth.

The results were as follows:—Radishes treated, 63; radishes not infested, 42; radishes infested, 21.

VI. Nitrate of Soda.

Nitrate of soda was also tried, the idea being that it would stimulate rapid growth and thus enable the plant to resist the ravages of the maggot, to a large extent, on account of its stronger constitution.

The results, which were unsatisfactory, were as follows:—Radishes treated, 165; radishes not infested, 40; radishes infested, 125.

VII. Acid Phosphate.

The idea of this experiment was to determine whether the acid nature of the phosphate would have any effect upon the root maggot, rather than stimulating the growth of the plant.

A dressing of one ounce to the square yard was applied. The results were as follows:—Radishes treated, 197; radishes not infested, 75; radishes infested, 122.

It will thus be seen that the application of acid phosphate as well as that of nitrate of soda, is not of great value. However, the yield of radishes was undoubtedly increased to some extent, and at the same time some benefit resulted.

In conclusion it appears most advisable to employ Pyrethrum powder mixed with flour and dusted on dry, or else the carbolic emulsion. Carbon bisulphide also gives good results, but unless carefully applied, there is a danger of killing the plant, because of the effect of carbon bisulphide in excess upon the roots.

Any application used should be repeated about once a week.

Spraying with Crude Petroleum and with Emulsions of Crude Petroleum and Water.

Owing to the great value of crude petroleum as an insecticide, when applied in a diluted state, the following experiments were carried out, in order to determine the burning effect of crude petroleum, and of emulsions of crude petroleum and water on the foliage when applied at different strengths on different species of fruit trees.

The following species of trees were selected:—Apple, pear, plum, peach, cherry and currant. Crude petroleum undiluted was applied to each of these trees, and also emulsions of crude petroleum and water were applied at the following strengths:—1. Crude petroleum, 100%; 2, 50%; 3, 35%; 4, 25%; 5, 15%.

It will thus be seen that a fair test was allowed each tree, the strengths varying from 15% to 100 % and thus a fair estimate has been attained, showing what strength of crude petroleum is safe to use on the different trees mentioned. The stronger the strength at which crude petroleum is applied, the more certainty there will be of thoroughly ridding the tree of scale insects, but on the other hand if too strong a percentage be applied, and the foliage of the tree severely burned and growth injured, then we defeat our object.

We may rid the tree of all scale, but we may also cause its death in so doing.

This series of experiments then was undertaken to find the safest strength at which to apply it, and to compare the effect on different trees.

Experiments on Apple.

100%.—This application was made early in the spring when the tree was in leaf. The spray killed all the foliage, and at the time apparently destroyed the tree. Later on, however, it regained its normal condition, and clusters of dwarfed but vigorous leaves were produced. No fruit was borne.

50%.—This application was made a little later in the season. In this case the branch appears to be quite dead, the wood being dry and brittle. No fruit was borne.

35%.—Leaves, buds and fruit all destroyed, and wood very badly blistered, but still green and living beneath the outer bark. No fruit borne.

25%.—Leaves all killed and wood somewhat burned. Growth appears prevented more or less. No fruit borne.

15%.—Wood not burned, but leaves nearly all killed. Tree broke into leaf later on. No fruit, however, was borne.

Experiments on Pear.

100%.—All green growth was killed, and no fruit was borne. The wood also was badly blistered. Altogether the results were most unfavourable.

50%.—The leaves were all killed and no fruit was borne. At a later date the tree made somewhat of a recovery, growth being restored, and fresh leaves opening. This application is, however, altogether too strong for pear trees.

35%.—In this case also nearly all the buds and leaves were destroyed, and a large percentage of the fruit borne. Growth was not injured to such an extent as in the previous applications.

25%.—Most of the leaves were killed, but the buds were uninjured and produced healthy and vigorous leaves. No fruit was borne.

15%.—This application resulted in about half the leaves being injured. The buds were not destroyed and development and growth was little interfered with. No fruit was borne.

Experiments on Plum.

100%.—In the case of plum there appeared to be very little difference between the effects produced by the application of crude petroleum, in strengths of 100%, 50% and 35%. The main difference noticed was that the weaker solutions took longer to do their work. All, however, killed leaves, and buds; no fruit was borne. Growth and development was also prevented.

25%.—This gave much better results. The leaves, however, were burned and partially destroyed in many cases, but they were nearly as numerous as on an unsprayed tree. Development and growth were apparently but little checked. No fruit was borne however.

15%.—This application gave about the best results. Little damage was done, few leaves being burned and growth apparently being little interfered with. Fruit of good quality was also borne, but rather small in size.

Experiments on Cherry.

100 and 50%.—Here again as in case of the plum we find but little if any difference in the results obtained from the application of 100% and

50%. In both cases the leaves, buds and branches were all killed, growth checked, and the branch rendered useless and dead.

35%.—In this case also, the leaves and buds were completely burned, and no fruit was borne. The results differed only from those given above, inasmuch that the injury to the bark was not as severe and complete as in 100% and 50% applications.

25%.—The branch developed leaves, though it only bore about half the number that unsprayed trees did; the buds, however, were not much injured, and some of the leaves were slightly burned around the edges. Only one cherry was borne and this was small and shrivelled.

15%.—Growth in this case was normal, and but little checked. The leaves were only slightly burned. The branch bore fruit, although of an inferior quality. The fact that the fruit was poor is due possibly to a too thorough application of the emulsion.

Black Currant Experiments.

100% and 50%.—Between the results obtained from these two applications there appears to be but little difference. In both cases leaves, buds and wood were completely killed, and no fruit at all was borne.

35%.—In this case also all the leaves that were reached by the spray were burned, mostly, however, only around the edges. Growth was not altogether checked and the branch bore fruit, though of an inferior quality, and few in number. The wood did not appear to be affected.

25%.—About 60% of the leaves were burned, though not to such an extent as in the case of the 35% application. The buds were little injured, if at all, and new leaves were developing from the terminals. Fruit borne was rather poor and longer in maturing than in the case of that unsprayed.

15%.—Few leaves burned and growth not much affected. Development of fruit and leaves not much interfered with.

Conclusions.

As a result of these experiments it is clearly shown that crude petroleum, and even emulsions of crude petroleum and water, applied diluted to 15%, are not suitable as a summer wash for fruit trees. In all cases the 100%, 50% and 35% proved disastrous and generally resulted in the killing of the tree.

Applied in the winter, it is fully as effective against scale insects as kerosene, and is harmless to the most tender varieties.

EQUIPMENT.

The scientific equipment of this department has been greatly improved during the current year by means of the grant placed at our disposal for this purpose. An elaborate and excellent projection apparatus has been purchased for the illustration of lectures. It is of the latest and most improved design, and is so arranged that a change can be instantaneously made from the exhibition of ordinary lantern slides to those employed in the microscope. We are thus enabled to bring before our classes minute details of structure, as well as objects of great beauty and interest in a manner which could not hitherto be done.

We have also procured a new apparatus for micro-photography with a special microscope for use with the camera. This will be of great value in making photographic records of living insects and their work, of zoological dissections and of microscopical preparations.

The collections of the Department have been largely increased in value by the purchase, through the liberality of the Department of Agriculture, of Mr. A. H. Kilman's extensive collection of North American Coleoptera and other insects. The Coleoptera are being re-arranged and form a reference collection of great service which is being constantly made use of. During the season many specimens have been added to our general collections and large numbers of some common species have been procured for laboratory purposes.

Among the additions to the Museum may be mentioned a fine specimen of the Canada Lynx, which was shot in the County of Middlesex, and a pair of Turkey Buzzards from the same district; also a Blue Heron obtained near Guelph.

Messrs. Holt, Renfrew & Co. of Quebec and Toronto have presented a collection of about sixty specimens of furs from various parts of the world which are used in the manufacture of fur garments, caps, etc.

An interesting exhibit of Jamaican animal and vegetable curiosities has been kindly lent to the Museum by Mr. T. D. Jarvis.

There are many deficiencies in the collections which it would be desirable to fill up; we especially need more specimens of the mammals of Ontario, and also of birds, fishes, reptiles, etc., in order to complete the series and make the Museum more useful in an educational point of view, as well as more attractive to visitors. Much might be done in this respect by the co-operation of the students in their vacations and by those who have completed their College course and are now scattered over the Province.

We rejoice to see that the "Insectary Building" is now under construction and will be ready for occupation next term. It is too late in the season to procure much material for experimental work this winter, but with the opening of spring and the revival of animal and vegetable life there will be plenty of objects for study. We look forward to being able to largely increase the usefulness of this Department by having so convenient a place for working out life histories of injurious and other insects, and conducting experiments in parasitism and artificial methods of repression.

ENTOMOLOGICAL SOCIETY OF ONTARIO.

An event of more than ordinary interest and of much importance to the College was the removal in September of the headquarters of the Entomological Society of Ontario from London to Guelph. For some time past it has been the opinion of the Ontario Department of Agriculture and the authorities of the College that the usefulness of the Society would be very much increased, and at the same time it would be of great benefit to the students, if the library and collections could be rendered available to them. This has now been satisfactorily brought about by the action of the Council of the Society, who recently decided in favor of the removal by a large majority. The packing and transportation were successfully accomplished by the end of August and early in September the cabinets and other collections of insects were arranged in a portion of the southern room of the Museum which has been set apart for the purpose; they are under the supervision of Mr. J. E. Howitt, the Society's Curator. Mr. Jarvis and I have frequently made use of some of these collections in illustration of our lectures, while the reference cabinets have been frequently consulted for the identification of specimens by students and others as well as ourselves.

The books and periodicals are arranged in a series of stacks set apart for them in the lower flat of the College Library, and have been placed in my charge. They have all been arranged systematically on the shelves, with the exception of some of the numerous Bulletins and foreign magazines which are received in exchange for the "Canadian Entomologist." These are being gradually sorted out as time permits, and I hope will soon be in good order and available for reference. This large addition to the scientific department of the Library is a very valuable one, especially to advanced workers in Entomology; many of the books are very rare and expensive, and the series of journals of Entomological and other scientific societies it would be difficult to duplicate. A certain amount of use is being made of these volumes, but they can hardly be properly available till there is a complete card catalogue for consultation in the Library Reading-room, similar to those in use for the books belonging to the College. It will immensely increase the value of this Library to the students, consisting as it does of nearly 2,000 bound volumes and a very large number of unbound publications, if such a catalogue can be made.

The location of the Society's headquarters in our midst has caused the Guelph Branch, which was formed last year, to be merged in the parent Society, and meetings of the Society are now held fortnightly in the Biological Building, and are well attended by many students of the College, and the Nature Study class from the Macdonald Institute, as well as by the members. At the annual meeting held here in October, Mr. Jarvis was elected vice-president and acts as chairman at all ordinary meetings. The members of the Wellington Field Naturalists' Club heartily co-operate with the Entomologists and joint meetings are sometimes held; on all occasions the members of each Society are welcome visitors at the other's meetings.

The annual meetings of the Entomological Society, which bring together the leading Entomologists of the Dominion and usually some eminent worker from the United States, will always, as a rule, be held here. They must prove, as those held at the College in both 1905 and 1906 assuredly did, an inspiration to the students and an incentive to increased interest and exertion in this great field of biological research. It may be mentioned that the active officers of the Society, apart from the Directors, who are resident in their respective districts, are members of the College staff, viz.: Mr. T. D. Jarvis, Vice-President; Mr. E. J. Zavitz, Secretary; Prof. McCready, Treasurer; Prof. Bethune, Librarian and Editor of the "Canadian Entomologist."

Before concluding this report, I wish to speak in the highest terms of the ability and industry of my colleague, Mr. Tennyson D. Jarvis. He is indefatigable in work and does excellent service in outdoor experiments and observations, in clear and instructive lectures in the class-room, and in the varied duties that devolve upon him in the laboratory with the advanced students. His ready assistance and cordial co-operation have smoothed away difficulties that might have proved troublesome in carrying out the new duties pertaining to my first term as Professor of Entomology and Zoology.

Respectfully submitted,

CHARLES J. S. BETHUNE.

PART VII.

THE PROFESSOR OF CHEMISTRY.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to submit herewith my sixth annual report of work done in the Department of Chemistry.

The work of the department very naturally falls into three divisions: First, Teaching; second, Miscellaneous work, and third, Investigation work.

Teaching.

This is naturally the most important part of our work. As the chemistry of the common things around us is better understood, we see that a knowledge of this subject forms a very important part of the foundation work of nearly every subject on the College curriculum. It is essential to the understanding of the work in Animal Husbandry, Agronomy, Dairying, Horticulture, Botany, Physics, and Home Economics; for, whether we are interested in foods, or the feeding of plants and animals, or in the cultivation of the soil, or the handling of milk, or the many problems of the home, a knowledge of chemistry is essential if we are to secure the best results. Not only is it essential, but it gives an added interest to all the operations of the farm and home, because it is possible, through a better understanding of the subjects, to work more intelligently. Thus it is that the results of chemical research and science in general are gradually solving the many problems of practical agriculture, and that rule of thumb work is being replaced by methods based on scientific facts. It is these scientific facts, many of which are of inestimable value in agriculture, that we seek to bring before the students in such a manner that they may see their practical application. Naturally such teaching requires an intimate knowledge of the results of the latest research work, and entails more than the ordinary amount of continuous preparation on the part of the instructors. I am very glad to report that the interest shown by the students of the different years in their various studies has been very satisfying.

The only radical change in the teaching work of my department is that, at your request, we now give instruction in Geology. In former years it was taught in the Biological Department; but, after Prof. Lochhead's resignation and the rearrangement of the work formerly under his charge, it was thought that the teaching of Geology and its relation to agriculture might very profitably be taken up in connection with the chemistry of soils, fertilizers, etc. Consequently, commencing with this term, the instruction in Geology has been given in the Chemical Department. The teaching of the subject has been assigned to Mr. Gamble, Lecturer in Chemistry, who is well prepared in the subject, and quite capable of handling it in a thoroughly practical manner.

On the first of October Mr. E. G. de Coriolis, B.S.A., Demonstrator in Chemistry, severed his connection with the department to accept a lucrative position with the Cuba Railway Co. In Mr. de Coriolis I lost an able instructor, a careful analyst, and an agreeable co-worker. Mr. H. L. Fulmer, B.S.A., Fellow in Chemistry, was promoted to the position of Demonstrator and Mr. G. G. White, B.S.A., was appointed Fellow. These changes have made necessary a slight rearrangement of the work of the laboratory. Both men are doing efficient work in their respective positions.

MISCELLANEOUS WORK.

Apparently every year there is an increase in what might be called College extension work. I refer to the correspondence, addressing of Farmers' Institute meetings, conventions of various kinds, and the answering of questions and contributing articles to the different agricultural papers. This is a very important part of our work, for it serves as a means of keeping us in touch with the every day practical problems of the farm.

MISCELLANEOUS ANALYSES.

A large number of miscellaneous samples of substances of various descriptions have been examined during the year. We cannot always make the analyses required, partly because of the amount of work entailed and partly because the samples forwarded do not accurately represent the substances of which they are a part. We also strive to keep away from what may be termed commercial work, and devote our time to the examination of substances which deepen our knowledge of the common materials useful on the farm,—as manures, foods, etc.,—and to aid the farmer in arriving at a true idea of their value. Many of these analyses are not of sufficient value to report here, although the results obtained are frequently of great value to us in answering the questions of correspondents. Reference will be made to one or two of these substances of some general interest.

Garbage Ashes. There is a large number of tons of ashes produced at the garbage disposal plant in Toronto each year. The fertilizing value of these ashes will, doubtless, vary widely, depending on the nature of the refuse burned. A sample as it was taken from the heap, forwarded to us for analysis, gave the following results:

Lime (CaO)	6.5	per cent.
Potash (K_2O)	1.92	"
Phosphoric acid (P_2O_5)	2.67	"

Valuing these ashes on the basis of 5 cents per pound for potash and phoshoric acid, they are worth $4.60 per ton. It is quite possible that the sample analyzed contained more than the usual amount of bone ash, but it is certain that ashes of the quality of the sample sent in are well worth looking after.

Tankage. There are about 5,000 tons of the refuse from the pork packing houses in Ontario shipped out of the Province every year. This refuse, or tankage, contains a large amount of nitrogen and phosphoric acid. The sample sent to us for analysis contained the following amount of fertilizing constituents:

Nitrogen	7.55	per cent.
Phosphoric acid (P_2O_5)	14.20	"

When properly ground the nitrogen in this substance is worth at least sixteen cents per pound and the phosphoric acid five. At this rate the tankage of the above composition would be worth about $38.00 per ton. Samples received at other times have not come up to the standard, and it would not do to assume that all tankage is worth as much as this, but it is a valuable manure.

Preservatives in Milk. In July twelve samples of milk were sent to the Chemical Department by Dr. McLay, Medical Health Officer, Woodstock, to be examined for preservatives. Three of these samples were found to contain formalin. The milk dealers supplying the adulterated samples were prosecuted by the Woodstock authorities. Formalin is a very efficient preservative; but, because of its injurious effect on the system, its use is prohibited. Further, the use of formalin, or any preservative, encourages careless methods of handling. Surely infants and invalids, who are the largest consumers of milk, have enough difficulties to contend with without having to deal with preservatives and all the filth they may help to cover up in the milk.

EXPERIMENTS WITH FERTILIZERS.

Under natural conditions a forest or prairie soil increases rather than decreases in fertility. The elements taken from the soil are returned to it on the decay of the plants, or on the death of the animals which feed on the plants. Thus the surface soil becomes rich in organic matter and in ash constituents which have been collected from the subsoil and left in organic combination at the surface.

As soon as the land is cultivated, oxidation of this organic matter is increased, a larger amount of water percolates down through the ground, and along with it the plant food which has been rendered soluble, and the vegetable and animal products of the land are consumed off the soil on which it was grown. A partial return of the plant food is made by the application of farmyard manure; but the sale of the grain, animals and animal products, and the loss of the fertilizing constituents from the manure before it is applied to the land, all tend to make the return of plant food to the soil incomplete.

Some soils are naturally rich in the elements of plant food, and when the crops are so rotated as to economize this natural wealth, it will be a long time before the soil needs any artificial manures; but, if the soil is naturally poor, and if special crops of like nature have to be grown year after year, it may soon need some special manuring.

During the last few years farmers have taken an increased interest in artificial fertilizers, and there is a demand for definite information regarding how and when they shall be used. Naturally this demand has come first from the vegetable, fruit, and sugar beet growers. Their crops require the expenditure of a large amount of labor in the cultivation and marketing. They are, consequently, anxious to produce maximum crops and of the very best quality. Moreover, in the majority of cases, they wish to grow the same crop, or one very similar in nature, year after year on the same soil.

I have always cautioned beginners in the use of fertilizers against the application of large quantities of these expensive materials without first obtaining some definite information regarding the need of the crop, the soil, and the nature of the fertilizer. As the requirements of the soil and crops vary, no one manure or mixture of manures can be recommended for all cases, and the growers have difficulty in deciding what fertilizer to use.

To aid them in this part of their work, we have during the last two years, planned experiments and supplied the fertilizers for practical tests on their own grounds. This last year we had twenty-one, three plot experiments, with the vegetable growers of the Toronto and St. Catharines districts; seven three plot experiments, with the oat crop on swamp soils; and five two plot experiments with sugar beets. In the last case we made the plots one acre in size, and through the kindness of Dr. Shuttleworth of the Ontario Sugar Co., arrangements have been made to have these plots harvested separately, weighed, and tested at the factory, thus placing these tests on a commercial basis. This is the second year this experiment has been conducted; but the results for the present year are not all in. Consequently, as we have only one year's results on all the work, no figures will be given here.

On the College farm, with Prof. Day's permission, we had 13 one-tenth acre fertilizer plots. Various quantities and mixtures of fertilizers have been used on these plots, and our intention is to determine the increase in yield and the effect on the quality of the crop throughout the full rotation. As the results from these and other experiments accumulate, we hope to have information which will be of value, and at the same time help to familiarize the growers with the nature of the experimental work required, and increase their knowledge of the function of the various fertilizer constituents.

SOILS OF THE ABITIBI DISTRICT.

During the last two years we have received and analyzed 18 samples of soil for New Ontario. As these are virgin soils, the results of the analyses should give a fairly clear indication of their productive capacity, provided that they are properly drained and cultivated. At my request, Mr. Fulmer prepared the following article on these soils:

Roughly speaking, the Abitibi District occupies that portion of New Ontario found in the Districts of Algoma and Nipissing and lying between the latitudes 49-51 north. Thus it will be seen that this part of the Province is not so far north as the name is apt to cause the southern resident to imagine. It is practically on the same line with that of Winnipeg and Regina and lies a good many miles south of Saskatoon and a great many more of the newly opened up wheat-raising belts of Saskatchewan and Alberta. It is beyond the height of land and has a northern exposure and has not the benefit of the warm tempering winds from the south with which the central west portion of Canada is favored; yet the temperatures are not unbearable, and during the summer months it is nothing uncommon to have the thermometer reaching to the upper eighties. The growing season is some three weeks later in beginning than in older Ontario, but is accompanied by plenty of sunshine and rain, the two conditions which will bring the more hardy of our root and grain crops to maturity.

The all important question, however, the one concerning the suitability of its soil for producing the ordinary farm crops in paying or even sustaining quantity, and the potentiality of the same for supporting an agricultural population for any length of time, has not, as yet, been answered to any satisfactory extent. True, surveying and exploring parties returning from there give glowing reports as to the magnificent extent of apparently fine farming tracts, well wooded with principally the pulping varieties of forest trees, admirably situated, lying as they do largely along the banks of rivers and about lakes which are there rather numerous, as one would expect in a Laurentian region, together with the excellent opportunities afforded for draining the more inland parts, which are now wet and swampy, but which, if reclaimed, would bring into use deep and rich virgin soils. This information is too meagre, though, to offer much inducement to the homeseeker who has not the hardihood of a pioneer.

That a chemical analysis of representative soils from Abitibi will throw a little light upon the potentiality before referred to, of this district, is, I think, sufficient reason to warrant the presentation of what little data we have collected along that line in this department. During the summers of 1904 and 1905 Dr. A. Henderson of Toronto, in the capacity of biologist of an exploring party, collected a large number of samples of soil, the more promising ones of which he sent to this laboratory. Therefore it is through his kindness that we are enabled to produce these results, together with any data attached concerning location, timber, vegetation, etc.

COMPOSITION OF ABITIBI SOILS.

No. of Soil.	Moisture.	Organic and Volatile matter.	Insoluble residue.	Iron and Aluminium Fe_2O_3 Al_2O_3	Lime. Ca. O.	Magnesia. Mg. O.	Potash. K_2O.	Phosphoric Acid. P_2O_5.	Nitrogen.	Humus.
1905										
1	1.4	3.9	86.3	6.52	.795	.51	.25	.115	.087	1.28
2	.22	1.39	96.0	1.04	.46	trace	.095	trace	.047	.45
3	3.4	13.55	67.3	9.23	1.62	.48	.75	.17	.387	6.98
4	.72	3.64	68.7	4.3	.91	.77	.183	trace	.07	.90
5	4.30	14 33	64.8	12.15	1.29	1.34	.74	.143	.297	5.05
6	3.91	7.36	68.1	14.45	1.08	2.26	.864	.105	.12	1.07
7	5.15	14.27	60.31	13.55	1.58	1.6	.89	.24	.157	8.21
8	5.29	19.24	54.8	11.81	1.81	.61	.96	.238	.512	6.42
1906										
9	12.14	74.46	4.26	.85	2.92	trace	.123	.305	1.414	25.7
10	.41	6.04	71.19	6.94	5.93	"	.207	.295		
11	1.79	4.28	79.09	10.85	.99	.293	.215	.049		
12	14.17	74.64	3.09	.17	2.66	trace	.111	.325	1.827	19.05
13	.88	16.26	51.47	8.85	15.13	"	.475	.285	.035	
14	2.54	7.57	76.32	11.71	.34	"	.32	.24	.112	
15	6.36	19.75	58.49	12.27	1.35	"	.451	.285	.378	12.4
16	2.02	4.2	82.35	9.01	.73	"	.37	.225	.0212	
17	1.39	2.9	83.02	8.30	1.18	.485	.356	.21	.021	
18	2.86	4.54	77.3	10.88	.91	"	.699	.265	.042	
19*	2.69	10.23	72.3	7.57	2.46	1.13	.434	.394	.286	4.19

*Average of ten soils from the College farm.

No. 9—5.68% residue of undecayed wood.
No. 10—Quite highly carbonated subsoil of 9.
No. 12—14.7% residue of undecayed wood.
No. 13—Very highly carbonated.
No. 14—Subsoil of No. 15.

No. 1. From Frederick House River bank at north boundary of Mann Township. Loam. Drainage good. Well wooded with poplar, spruce and balsam.

No. 2. From north boundary of third township north of Tully Township. A loam soil, bearing poplar, spruce, balsam, balm and birch.

No. 3. From Teefy Township. This represents soil occupying about sixty-two per cent. of the township and is well wooded with large poplar, black and white spruce, balm of Gilead, balsam and occasional birch and jack pine.

No. 4. Collected in Knox Township. Apparently well drained. A clay soil with timber similar to No. 3, but not so heavy.

No. 5. Teefy Township at Iroquois Falls. This is a heavy clay soil representative of the clay belt.

No. 6. From bank of creek flowing into Frederick House River, near Niven's Line. Timber scattered and much windfall. Clay to heavy clay.

No. 7. Tamarac Swamp subsoil, north Abitibi River, opposite mouth of Dokis.

No. 8. From banks of creek in Knox township. Most productive soil in Abitibi country.

No. 9. Decaying peat from spruce woods.

No. 10. Subsoil from under No. 9. Heavy clay.

No. 11. Taken from Patten's baseline at milepost between Muskego and Mattagami. Clay.

No. 12. Same locality as No. 11.

No. 13. Landslide on bank of Mattagami, two miles above Niven's Line of 1900. Clay.

No. 14. Patten's Meridian of 1904. Clay loam.

No. 15. Soil above No. 14.

No. 16. Taken six miles east of the Mattagami, opposite milepost eight, on Speight's Meridian, 1905.

No. 17. Eastern boundary Mahaffy Township, between concessions 5 and 6.

No. 18. Taken from the bank of the Mattagami River, one mile south of north boundary of Mahaffy. The banks of this river are well wooded with the usual river bank trees—poplar, spruce, balm of Gilead, birch, balsam and some cedar.

The results recorded in the above table, noting the amount of the different constituents present in the soils, were obtained by extracting for ten hours at the temperature of boiling water with strong hydrochloric acid (1.115 specific gravity). Therefore the amounts indicated of the different elements of plant food do not show the total amount present in the soil of those more difficultly soluble elements, such as potash and aluminium, but they do show, according to repeated observations, the limits to which each is subject to attack by the roots of a growing plant. In the case of lime, magnesium and phosphoric acid probably the total amounts present are shown; and with nitrogen and humus the percentage shown is practically absolute. To quote Hilgard ("Soils," page 340) "the analysis of soils by extraction with strong acids is intended to enlighten us, not in regard to their *immediate* productiveness, but as to their *permanent value or productive capacity*." Our results show, then, merely the productive capacity, or in other words, the potentiality, of the soils in question. Of the immediate productive capacity, or the availability of the different elements of plant food for at once nourishing a crop, our table tells nothing. And this is where this sort of chemical analysis fails.

Where our figures are of value though is where they show when an element is present in too limited a quantity to allow of a profitable crop production. By extended analytical work, skilfully done, and by the combination of the same with unlimited cultural experience, a great many of our eminent and conscientious workers have arrived at figures which denote pretty accurately the limits of the most important elements which are allowable in a profitable agricultural soil, and which show the need or not of an amendment or ameliorant.

To form a basis for discussion, now let us note what these limits are. As we are dealing with what are *virgin soils* we will use the limits designated by Hilgard in his book, "Soils." When such soils are investigated it becomes apparent that besides the low percentage of one ingredient, the proportions of others present require consideration. Lime is one of these. If present in the carbonate form it exerts a very beneficial influence in a great many ways, as is witnessed by the marked change in vegetation in passing from a district where it is plentiful to one where it is deficient. To make a statement, it is found that where calcium carbonate is plentiful percentages of potash, phosphoric acid, and nitrogen below the limit, are allowable. This fact will make a difference in our discussion. The minimum limit for potash is given as .25 per cent., for phosphoric acid (P_2O_5), .1 per cent. to .05 per cent., for nitrogen, .1 per cent.; whereas .45 per cent., .1 per cent., and 1 per cent., respectively, are considered quantities showing adequate supplies of these three. With lime, the limits differ; on a sandy soil .1 per cent. is necessary to give the characteristic lime vegetation, while on heavy clay soils .6 per cent. is needed.

Turning now to our table of composition, we shall see what the productive capacity of some of our Abitibi soils promises to be. Glancing down the column headed CaO, we find that, standing by itself, there is likely none of the soils deficient in lime, and most of them are abundantly supplied with it, soils 10 and 13 being markedly rich in what is apparently the carbonate, the most active form of this constituent. In potash (K_2O), soils 2, 4, 9, 10 and 12 are all deficient. Soil No. 1 is just on the limit; while all the rest are quite well supplied. Two soils, Nos. 2 and 4, are markedly poor in phosphoric acid (P_2O_5), while Nos. 1 and 6 are just merely above the limit in the same constituent. In nitrogen we have a remarkable condition for soils which have as yet never been cropped. No less than eight out of the eighteen are below the limit in this element of plant food, and only two, Nos. 9 and 12, show a quantity which would give a supply for years to come, providing a system of exhaustive cropping were to be followed. Soil No. 10 shows no nitrogen, but this is not important, since it is a subsoil of No. 9, which contains an abundance. It shows plainly, though, that the stage of decomposition of the covering of vegetable matter above has not as yet proceeded very far. This is borne out by the remark after No. 9. Humus in those soils in which it was determined is quite abundant except in soils Nos. 2 and 4. Humus is a very important constituent, for a soil's water-holding power depends largely on it; and it is an excellent ameliorant for a clay soil, to which all the soils in the table are, interpreting the aluminium (Al_2O_3) column correctly, with the exception of soil No. 2, and, of course, the clearly peat soils Nos. 9 and 12. Magnesia (MgO) is an element essential to plant development. A ton of ordinary hay will contain 7 pounds of it, and other crops take up a corresponding amount. We find that it is reported as occurring in nine of the soils only in traces. Plainly if it is not in the soil, the plant can not develop.

Taking the soils separately, we can arrive at more definite conclusions. Soil No. 1 is only an average soil; it is just about on the limit in all its important constituents. With lime as an ameliorant it would likely give satisfactory results, provided it were carefully nurtured. No. 2 is notoriously poor in everything and can certainly be condemned as hopeless. Soil No. 3 is good, and is representative of about 62 per cent. of Teefy Township. It has not an abundant supply of P_2O_5, but the lime is abundant enough to alleviate this difficulty. Soil No. 4 can be condemned for lack of P_2O_5 and deficiency in nitrogen and potash. Nos. 5, 6, 7 and 8 are all bountifully supplied with K_2O and can probably be classed as good agricultural soils No. 5 soil is representative of the clay belt, and is without doubt a good one. No. 7 is a subsoil and is remarkably rich. Here deep plowing would undoubtedly soon produce a fine productive soil. Soil 8 is considered to be the richest soil in the Abitibi district, and its composition compares with the productive soils of the College farm (No. 19). All these four soils are fairly heavy clay, but they contain enough lime and vegetable matter to alleviate them and allow them to be worked up into a friable condition. No. 9 is almost wholly peat, but with its subsoil, following a system of deep plowing, would soon produce a good soil. There is enough $CaCO_3$ (5.93 per cent. CaO, which is largely present as carbonate) to retain a neutral reaction on the decay of the organic matter and to allow the process of nitrification to proceed smoothly. Soil No. 12 is another peat bed, and is yet not very far advanced in the stage of decomposition. If it has a desirable subsoil, it will be to it a valuable source of nitrogen and humus in some future time. No. 13 is taken from a landslide, and, as might be expected, is highly charged with $CaCO_3$, due to the working up to the surface, during the time of the slip, of particles of limestone and granite. Soil 14 is the subsoil of 15 and shows the depth to which the abundance of mineral constituents extend. The remaining soils, 11, 16, 17 and 18 do not require any special mention, except that they, along with Nos. 1 and 13, range low in nitrogen.

Out of the sixteen soils (taking 9 and 10 as one, and also 14 and 15) probably only two, Nos. 2 and 4, can be condemned. As to the extent of territory which these occupy, there is no data at hand to show. All the rest can be accepted as possessing productive capacity, although none of them, except No. 8, come up to the standard of a virgin soil. Magnesia is reported as present only in traces in a great many cases, but there is probably enough present to satisfy the wants of numerous crops. Nitrogen is also low in 6 cases (1, 11, 13, 16, 17 and 18), but by careful cultivation and the use of leguminous crops this drawback would be overcome to a great extent.

While it is true that the conclusions arrived at from the results of chemical analysis alone cannot be taken as final, we feel justified in stating that, where drainage and cultivation receive due attention, much of the soil in the Abitibi district possesses sufficient plant food to grow many remunerative crops, and that it has a great agricultural future.

INVESTIGATION WORK.

The main line of research work carried on during the last year was in connection with breakfast foods. We have analysed 68 samples of these foods and have conducted 47 digestion experiments with the human subject in order that we may ascertain their composition and digestibility. We are also determining the extent of the change caused by the predigesting of breakfast foods, and the extent of the changes brought about by long and short periods of cooking the raw materials. This latter part of the investigation is not completed. When all the work is finished, we intend preparing a bulletin on the subject. In the meantime, I have summarized the results available and present them in the following article:—

BREAKFAST FOODS.

The cereal grains and the preparations made therefrom occupy a very prominent place in human dietaries. This is doubtless due to the fact that these foods are, as a rule, cheap; that, when properly prepared, they are comparatively easily and completely digested; and that they contain all the constituents required to nourish the body. Wheat bread has long been known as the "staff of life," and many of the grains have been used in the cracked or ground condition for ages; but within recent years an almost endless variety of wheat and oat products have been placed on the market under the name of "breakfast cereals" or "breakfast foods." According to the claims made for some of these new foods, they are not only a perfect food in a condensed form, but they are also brain tonics and have a variety of wonderful virtues.

The various types of breakfast foods may be roughly divided into the following classes: First, the uncooked, as the old forms of granulated oatmeal and the wheat farinas. The foods of this class are served either after cooking for a short time or after cooking for several hours. The latter method of preparation renders them more palatable and more easily digested. Second, the partially cooked, to which the rolled and flaked grains belong. In the preparation of these foods the grain is softened by steaming and then rolled and dried. During the process they are slightly cooked and the cell walls ruptured; consequently, this class of foods may be prepared for the table in less time than those of the previous class. A third class are the cooked foods, such as shredded wheat, which may be served at once without any special treatment. A fourth class are the malted foods. These are supposed to be both cooked and partially digested. Force, Orange Meat, Norka, Grape Nuts, etc., are types of this class.

In determining the relative value of foods, at least three points must be taken into consideration. These are chemical composition, digestibility, and cost. It is true that a food must be palatable and that it must "agree" with the person using it, but these are points upon which there is always likely to be a difference of opinion. That these cereal food products are relished is evidenced by the fact that they are so extensively used. This, too, is fairly good evidence that they "agree" quite generally with those who eat them. However, these are factors which cannot be measured and which do not after all seriously affect the value of any comparison that may be made.

In our study of the composition of the breakfast foods, a large number of analyses were made, the results of which are incorporated in the following table:—

PERCENTAGE COMPOSITION OF SOME BREAKFAST FOODS.

	No. of samples analysed	Water	Crude Protein	Crude Fat	*Carbohydrates	Crude Fibre	Ash	Energy per gram Calories
Granulated Oats.....	12	7.75	12.29	6.65	71.71	1.59	1.60	4.283
Rolled Oats	19	8.55	11.83	6.61	71.35	1.25	1.66	4.238
Wheat Farina.......	8	10.63	9.70	1.05	78.23	0.62	0.57	3.876
Wheat Germ.........	1	8.39	10.97	2.79	76.77	1.16	1.08	4.034
Rolled Wheat.......	2	10.41	8.77	1.90	77.22	2.05	1.70	3.860
Flaked Barley	4	10.58	9.71	1.43	76.81	2.07	1.47	3.854
Corn Meal...........	2	9.76	6.99	1.26	81.49	0.52	0.50	3.870
Orange Meat.........	3	8.66	9.70	1.31	78.43	†1.95	1.90	3.909
Force................	3	9.06	10.14	1.51	76.88	†1.85	2.41	3.886
Norka	3	7.38	14.33	5.55	69.91	†1.84	2.83	4.229
Malta Vita	3	8.23	9.88	1.39	78.27		2.23	3.915
Grape Nuts	3	7.08	11.49	.94	78.78		1.71	3.995
Canada Flakes	2	8.97	10.84	1.18	76.22		2.79	3.874
Shredded Wheat	2	9.41	11.53	.85	76.51		1.70	3.916
Rice Flakes..........	1	12.29	7.24	0.08	80.04	†0.55	0.35	3.716

*Including fibre.
†One result only.

The main functions of food are: First, to form the materials of the body and to repair waste; and, second, to yield heat to keep the body warm and to furnish power for the work it has to do. In the first case, the food serves for the growth and repair; in the second, it serves as a fuel.

The protein compounds are the principal tissue formers. They build up and repair the muscles and tendons and supply the albuminoids of the blood and other fluids. They may also be burned in the body, and thus may serve as a fuel. Protein, or more correctly speaking, a certain part of the protein, is the only constituent of the food capable of forming flesh or muscle, hence they are the most expensive.

Fat and carbohydrates, on the other hand, are the chief fuel ingredients of the food. The fat, however, is capable of producing 2.25 times as much heat as the same weight of carbohydrates. They may both be transformed into body fat when taken into the system in excess of what is required for heat and energy.

The crude fibre is practically indigestible, and, while it has a limited physiological value, much of it in a food detracts from its nutritive value.

The ash is used in the formation of bone, and to supply the organic materials in the fluids of the body.

If, then, with the above facts in mind, we study the composition of the breakfast foods, it will be found that the oatmeals and Norka, which is an oat product, contain the most proteids and fat, while all the other foods are richer in carbohydrates. The cornmeals are the lowest in crude protein and highest in carbohydrates, and the wheat farinas and cornmeal contain the least fibre. The germ is richer in protein and fat, consequently we are not surprised to find wheat germ richer in these constituents than the other wheat products. Taking all the facts into consideration, we would naturally be led to conclude that as the oat products contain the most muscle-forming substances and the largest percentage of fat, they are the most nutritious foods.

However, it is very hard to form a correct estimate of the nutritive value of foods, differing in composition, as these do, by balancing a high protein and low carbohydrate content against a low protein and a high carbohydrate. Possibly the best method of making a comparison, and the one usually followed, is to compare them on the basis of the number of calories of heat they will produce when burned. A calorie is the amount of heat required to raise one thousand grams of water one degree centigrade in temperature. It is usually assumed that one gram of protein will produce approximately 5.9 calories, fat 9.3, and carbohydrates 4.1. Calculating on this basis with each of the foods, we obtain the figures placed in the last column of table of composition. Reference to these figures shows that upon this basis of comparison the oat products stand highest and that the much advertised prepared breakfast foods have very little the advantage of the ordinary wheat farinas.

But the above figures refer only to the composition and heat producing power of the foods, and do not take into account the differences in digestibility, or the amount that would be absorbed by the body when they were eaten. It is only that part of the food which is digested and absorbed that has any nutritive value. Therefore, to carry the comparison further, we must determine the digestibility, or the availibility, of the constituents of the various classes of foods.

Owing to the many difficulties surrounding this part of the work, it is impossible to arrive at absolutely correct figures regarding the digestibility of a food. The method generally followed is to determine the difference between the quantity of each constituent, *i.e.*, protein, fat and carbohydrates, in the total food eaten and the amount of the corresponding ingredients in the feces. The difference is taken as the amount digested. This is calculated to percentage of the given nutritient digested; or, as it is generally called, the co-efficient of digestibility. Strictly speaking, the results thus obtained do not represent actual or true digestibility, because the feces contain not only the portions of the food that are not digested, but, also, other materials, such as digestive juices and excretory products. On the other hand, these waste materials, or metabolic products, may be considered as representing the cost of digestion in terms of food ingredients. Consequently, while the figures arrived at may be a little below the true digestibility of the food, they do represent the amount of food that will be available to the body.

Each of our digestion experiments extended over a period of four days, and healthy young men were used as subjects. They were all interested in the work and co-operated in every way to make the result as accurate as possible. Each subject was allowed to use sugar and cream of known composition to suit his taste, but an accurate account was kept of the amount consumed. As the food under experiment was also carefully weighed and analysed, it was possible to calculate the total amount of each constituent eaten. From this was deducted the amount of the various constituents found in the feces obtained from the food eaten during the experiment. The results got in this way must of necessity show the digestibility of the whole diet, and not of the breakfast food only. But, as both the sugar and cream would be almost wholly digested and were used in very nearly equal quantities throughout all the experiments, the results must be, at least, comparative. Naturally, however, with such materials as the farinas, where the percentage of fat is very low, the digestion co-efficient for the fat cannot be considered very accurate. The first part of the following table gives the percentage amount of each constituent of the full diet digested. Dr. Atwater states that 97 per cent. of protein, 95 per cent. of the fat, and 98 per cent. of the carbohydrates of cream and sugar are digested.* Assuming the correctness of these figures, we have calculated the percentage amount of each of the constituents of the breakfast foods digested and have placed these figures in the second part of the table.

PERCENTAGE AMOUNT OF EACH CONSTITUENT OF THE FULL DIET DIGESTED.

Name.	No. of digestion experiments.	Organic matter.	Crude protein.	Crude fat.	Carbohydrates.
Granulated oats	6	94.5	84.4	92.2	97.6
Rolled oats	10	94.7	82.8	93.5	98.2
Wheat farinas	11	95.6	79.8	95.3	98.2
Wheat germ	3	96.9	89.7	96.1	98.5
Rolled wheat	3	93.8	79.2	95.6	95.2
Flaked barley	5	95.4	76.2	94.8	97.0
Corn meal	3	96.2	81.7	95.3	98.6
Orange meat	2	93.4	84.4	94.9	95.5
Force	2	91.1	69.4	93.3	95.3
Norka	2	94.3	83.3	92.0	97.6

CALCULATED TO FOOD ALONE.

	Crude protein.	Carbohydrates.		Crude protein.	Carbohydrates.
Granulated oats	80.8	98.1	Flaked barley	69.1	97.1
Rolled oats	80.0	98.4	Corn meal	73.7	98.9
Wheat farinas	72.5	98.8	Orange meat	75.7	94.6
Wheat germ	88.0	98.8	Force	58.7	94.4
Rolled wheat	74.1	94.8	Norka	81.0	97.7

According to these results the wheat germ was more fully digested and absorbed than any other food. It stands highest in the amount of organic matter and in each of the various constituents absorbed from both the full diet and from the wheat germ alone. The protein of all the foods is less completely absorbed than the other constituents. This is particularly true of that in Force. It is also worthy of note that the carbohydrates of Orange Meat, Force and Norka were not so fully absorbed as they were from the other foods. Certainly there is nothing in these results to indicate that the high priced prepared breakfast foods are any more completely digested and absorbed than the wheat farinas and rolled oats, or even than the old forms of granulated oatmeals.

So far we have compared the foods on the basis of composition, fuel value, and digestibility, but to find the relative economy of these goods, their cost must be considered. From the data given in the preceding tables and the retail price of the foods, it is an easy matter to calculate the fuel value of the digestible matter obtained from the quantity of each of the foods that can be bought for a certain sum of money. For the purpose of comparison, we have calculated the number of calories of heat that the digestible matter in ten cents worth of each of the foods is capable of producing. The retail price of the foods in Guelph was used in the calculation.

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*Storrs Agricultural Experiment Station Report 1904, page 191.

Number of Calories of Heat Obtained from the Digestible Matter Contained in Ten Cents Worth of the Foods.

Food.	Price.	Calories
Granulated oats	In bulk 7 pounds for 25c	5128
Rolled oats	" " 7 " " 25c	5088
" "	In package 2 " " 10c	3635
Farinas	In bulk 7 " " 25c	4698
"	In package 2 " " 15c	2232
Wheat Germ	In bulk 7 " " 25c	4956
Rolled Wheat	" " 6 " " 25c	3934
Flaked Barley	" " 2 " " 10c	3330
Corn Meal	" " 8 " " 25c	5397
Orange Meat	" package 20 ozs. " 15c	1368
Force	" " 16 " " 15c	1136
Norka	" " 22 " " 15c	1639

The above figures show that upon this basis of comparison cornmeal is the most economical, with the oatmeals second and wheat germ third. Force stands at the bottom of the list, and only furnishes a little over one-fifth the number of calories credited to cornmeal. It is also plain that oatmeal and wheat farina are very much more expensive in package than in bulk. In the case of the latter substances, less than half the number of calories are obtained for the same money. The meal in the package may be cleaner and more conveniently handled, but if the meal can be procured from a dealer who is selling sufficiently large quantities to insure a fairly fresh supply, it is very doubtful if anything is gained by purchasing in package.

Among the goods put in package, the predigested foods are the most expensive. This is to be expected, as these foods have been mixed with malt and are cooked ready to serve. Just how much better they are for this treatment is hard to say. They may be more easily digested. All foods require the expenditure of energy in their digestion, and it is only natural to suppose that the predigested foods require less energy for this purpose than foods of the nature of rolled oats. However, we have no way of procuring data on this point, but certainly they do not appear to be any more fully absorbed in the system.

According to the above figures, then, it is evident that the raw corn, oat and wheat products, especially when bought in bulk, are the cheapest per pound. It is possible that the cost of fuel for cooking may render their use very little more economical than some of the prepared foods. These considerations must vary with circumstances. In many instances when a coal or wood fire is used, it is doubtful if the cooking of the porridge costs very much additional. These are, however, points on which conditions vary, so that it is practically impossible to gather reliable information, and each one must decide them for himself.

The thoroughness of cooking has an influence on the actual food value of all the breakfast foods, for if the cereal preparations are not well cooked, some of the nutritive material will escape the digestive juices. To gather some information on the digestibility of oat and wheat meals, as influenced by cooking for a short and for a long period, we cooked these foods for twenty minutes, the time commonly employed, and for eight hours, and then determined the digestibility in the ordinary way. In the case of the short cooking, the twenty minutes was taken from the time the mass began to bubble, and it was kept boiling hard throughout the whole time. In the long cooking experiment, the mass was brought to the boil and then placed in a double boiler and kept at the boiling point of water for eight hours.

In determining the digestibility, triplicate experiments were conducted with two samples of rolled oats and two of wheat farina. In order that the results might be strictly comparable, the same subjects were used in determining the digestibility of the meal cooked for the short and long period. Different subjects, however, were used with each sample of meal. This was done to bring in as many conditions as possible. The results of two experiments with the oat meal and one with the wheat farina were discarded. The digestion co-efficients were all very close, and only the averages are given below.

DIGESTION CO-EFFICIENTS OF ROLLED OATS AND WHEAT FARINA AS INFLUENCED BY SHORT AND LONG PERIODS OF COOKING.

Name.	No. of digestion experiments.	Organic matter.	Crude protein.	Crude fat.	Carbohydrates
Rolled Oats— Short cooking..........	4	94.2	81.5	92.5	98.0
Rolled Oats— Long cooking..........	6	95.4	84.3	94.6	98.3
Wheat farina— Short cooking..........	5	95.5	79.3	94.9	98.3
Wheat farina— Long cooking..........	6	95.3	79.4	95.6	98.5

From the above results, it is evident that the length of time the meal was cooked did not very materially influence the percentage amount digested. It is, of course, possible that less energy may have been expended in digesting that which was cooked the longer time; but no figures could be procured on this point. It is, however, important that starchy foods be cooked sufficiently long to cause the rupture of the starch cells. Judging by results, this apparently was accomplished, at least, nearly as well in one case as in the other.

From all the data presented, it is evident that corn meal, rolled oats and the farinas, especially if bought in bulk, are the most economic "breakfast foods." It is, however, true that these foods do not agree with everyone, and that the so-called predigested foods may be useful for those people who have difficulty in digesting starch. They may also have a place in a hurry-up breakfast; but it is evident that a curious name given to a much advertised food does not indicate a high nutritive value, and the intelligent buyer who has to consider economy will hardly pass by the old forms of breakfast foods unless his own experience has actually demonstrated that these newer foods have a superior value.

SUGAR BEET INDUSTRY.

In last year's report I gave a brief synopsis of the development of the sugar beet industry in Ontario. With reference to the present campaign, now nearly half completed, I may say that both the Berlin and Wallaceburg factories have a larger supply of beets than in any previous year, and it is probable that each company will slice about 55,000 tons. The quality of the beets delivered at the Berlin factory is quite satisfactory. The average percentage of sugar in the beets delivered up to date is considerably over 15, and it is fully expected that the average for the season will be slightly above the 15 mark.

In the vicinity of Wallaceburg the weather conditions have not been so favorable, and the average per cent. of sugar will probably be fully two per cent. lower than at Berlin. The long drought which prevailed in that section of the country did not break until late in September, and was then followed by excessively wet weather. The result is that the beets did not make sugar as rapidly as they should in the early fall, and when the wet weather set in they began to send out fresh tops, thus using up the sugar previously formed. These combined conditions have not only made the work of handling the crop unsatisfactory, but it has also reduced its value nearly one dollar per ton, as compared with former years.

Test of Different Varieties of Sugar Beets.

Ever since this department undertook extensive experimental work to ascertain the suitability of Ontario soil and climate for growing sugar beets for sugar factory purposes in 1900, we have co-operated with the Experimental department in determining the difference between the various varieties of sugar beets grown on the College plots. Some of the varieties experimented with are those commonly used as cattle food; others are of the type grown for sugar factory purposes. The seed of the latter varieties was procured from the best known seed dealers in this country and in Germany. The beets were all grown on the level, in rows 21 inches apart, and thinned so as to leave the plants 8 inches apart in the row. The object was to determine the yield per acre and the percentage of sugar, and also to obtain figures of comparison between some of the newer German varieties and the variety now extensively used by the sugar beet growers of the Province.

Percentage of Sugar and Purity of Juice of Different Varieties of Sugar Beets.

Among the cattle food varieties, the Giant White Feeding produced the largest beets, but the lowest percentage of sugar. The Royal Giant and Tankard Cream are also large beets with low sugar content. It is quite probable that these varieties will not give as good results when fed to cattle as the New Danish Improved, Red Top, and Giant Rose Feeding, etc., which contain more sugar. It is possible that a greater number of tons per acre may be grown of one variety than another, and this may be sufficient to offset the difference in the sugar content. The yield per acre will be found in the report of the Experimentalist, which forms Part XIII. of this volume.

Name.	Average weight of beets.	1906.			Average of six years.	
		Solids.	Sugar.	Purity.	Sugar.	Purity.
	ozs.					
New Danish Improved	21.4	12.7	9.6	75.4	10.9	80.1
Red Top	19.1	14.0	10.8	77.0	11.1	80.3
Royal Giant	23.4	12.1	8.4	69.5	9.9	79.3
Giant Rose Feeding	18.8	12.4	9.5	76.5	12.4	85.9
" White "	32.4	10.9	6.3	57.4	7.8	69.9
White Silesian	20.6	15.1	12.5	83.0	13.5	82.6
Red Skinned	15.4	12.6	8.5	67.0	11.3	80.6
Green Top, White	16.9	13.6	9.2	67.5	12.5	80.4
Lane's Improved	15.6	16.2	12.8	79.0	12.6	82.5
Champion	13.0	18.9	16.2	86.1	15.8	85.9
Kleinwanzlebener	13.5	18.3	16.0	87.8	16.5	87.4
French Yellow	14.9	15.9	13.2	82.9	12.2	81.5
Pitschekes Elite	15.3	18.3	15.9	86.8	15.9	88.6
Improved Imperial	13.2	19.9	17.8	89.3	17.0	87.2
					Average of five years.	
Tankard Cream	20.3	13.5	10.1	75.0	8.9	75.7
Jaensch's Victorix	12.3	18.6	15.7	84.6	15.9	85.3
Rubensamen Rimpan	16.6	19.9	17.1	86.1	17.3	87.7
					Average of four years.	
Rennie's Giant Sugar	18.6	11.9	9.1	76.6	10.0	78.4
Hybrid Sugar Beet Mangel	18.3	13.1	9.2	70.4	10.2	77.5
Imperial Giant Half Sugar	17.8	13.7	10.5	76.5	10.6	78.0
					Average of two years.	
Braune	16.4	17.9	14.8	82.6	15.7	88.8

Among the varieties comparable with the Kleinwanzlebener, which is at present the most popular variety with sugar factory beet growers, the Rubensamen and the Improved Imperial have done well. In fact the average results obtained from five years' experimental work in one case and six years in the other, show that on our soil these two varieties are at least the equal of the Kleinwanzlebener in purity, and contain slightly more sugar. Reference to the report of the Experimentalist will also show that there is very little difference between these varieties with regard to yield in tons per acre. What little advantage there is in tons per acre, percentage of sugar, and in purity is in favor of these new varieties, and especially of the Rubensamen.

Quality of Sugar Beets as Affected by the Distance Between the Rows.

This experiment has now been carried on for five years in succession. The beets have been grown on soil of uniform condition, in rows 12, 14, 16, 18, 20, 22, 24, 26, and 28 inches apart, and in every case thinned so as to leave the plants eight inches apart in the row. A duplicate set of plots has been grown each year, and in nearly every case at least two sets of samples have been collected for analysis from each plot every year. The object of the experiment was to determine what effect the distance between the rows would have on the yield per acre and the sugar content of the beets. The yields would be found in the report of the Experimental Department, and the percentage of sugar is given in the following table:

PERCENTAGE OF SUGAR AND PURITY OF JUICE OF BEETS GROWN IN ROWS DIFFERENT DISTANCES APART.

Space between rows.	Average weight of tared beets.	1906. Analysis of juice.			Average weight of tared beets.	Average result of five years' analysis.		
		Solids.	Sugar.	Purity.		Solids.	Sugar.	Purity.
Inches.	Ozs.				Ozs.			
12	10.5	19.8	17.3	86.9	10.3	20.0	17.1	85.7
14	11.6	19.2	16.1	83.8	11.6	19.8	17.2	87.2
16	10.7	19.8	16.8	84.4	13.4	19.6	16.8	86.4
18	10.0	19.6	17.0	86.9	12.8	19.3	16.9	87.8
20	13.4	18.8	15.5	82.5	14.4	19.7	17.0	86.3
22	15.9	19.2	15.1	78.6	15.5	19.3	16.4	85.2
24	15.1	18.7	16.2	86.8	17.3	19.4	16.9	87.3
26	16.1	19.1	16.0	83.6	18.2	19.0	16.9	88.8
28	14.8	19.5	17.1	88.9	18.2	19.3	16.8	86.8
30	17.8	19.1	16.5	86.6				

In all this experimental work, samples for analysis were collected from all the plots the same day, so that uniformity of weather conditions might be preserved. With one exception the average of five years' results shows that there was a regular difference in the weight of the beets as the distance between the rows is increased. There is, however, no corresponding falling off in the percentage of solids and sugar, and no decrease in the purity of the juice. According to these results, the distance between the rows, provided there is a full stand of plants, does not injuriously affect the quality of the beet. Naturally, there are a greater number of beets the closer the rows are together, but, although the average weight is less, the aggregate weight is greater, and the heaviest yields, and consequently the largest gross results, are procured from the rows grown close together. It is, however, quite probable that if these experiments had been carried out on low-lying and richer ground the results might have been quite different. The soil used was a loamy soil, not so rich in plant food as to retard ripening. This is seen in that the percentage of sugar and the purity of the juice is as high in the beets grown in rows 28 inches apart as in those grown 12 inches apart. Had the ground been stronger, the beets grown in the rows the wider distance apart might have been larger, but the sugar content would probably have been lower. Taking all points into consideration, I think it will be found that on average soil and under average conditions, *the best general results will be got when the rows are placed as close as possible without seriously inconveniencing the work of cultivation.* With the implements now at the disposal of the sugar beet grower, it is possible to conveniently cultivate between rows 18 or 20 inches apart, and this is the spacing usually recommended by those interested in the production of beets for sugar factory purposes. If the proper cultivators are not to be used, the rows may be placed farther apart, and, provided the full stand of beets is secured, the quality may be as good, but the yield will be less.

MOISTURE, SALT, AND CURD IN BUTTER.

Some time ago the complaint was made that Canadian butter was too dry and that, as a result, it did not "spread" easily. To aid the buttermakers in their desire to study methods of manipulation to incorporate more moisture, we offered to determine the per cent. of water in all samples of butter taken according to directions, and accompanied by a detailed statement of the methods employed in its manufacture. Altogether 162 samples were received. In all of these the per cent. of water was determined, and in some the per cent. of salt and curd. We also ascertained the per cent. of moisture, salt, and curd in 113 samples of butter entered in the butter contest conducted by the Dairymen's Association. The results of the analyses of all the samples are summarized in the following table:

	No of Samples.	Lowest.	Highest.	Average.
Moisture	375	9.04	19.92	13.5
Salt	168	.61	5.98	2.33
Curd	167	.102	.849	.564

The percentage of salt in a number of apparently saltless butters was determined, but these are not included in the above statement. It will be noticed that there is a very wide difference between the lowest and highest percentages of the different constituents determined. In eighteen samples the percentage of water was higher than 16, which is the maximum amount allowed by law. It must, however, be remembered that with 172 samples of the butter, the maker was studying methods of incorporation of water, and that the amount of moisture found in this butter would probably be above the average. The statement of the results obtained from the butter sent in from creameries as distinct from the contest butter is given below:

Butter from Creameries.	No of Samples.	Lowest.	Highest.	Average.
Moisture	162	10.34	19.92	14.1
Curd	54	.376	.849	.626
Salt	55	.61	4.04	2.74
Contest Butter.				
Moisture	113	9.04	15.82	12.0
Curd	113	.102	.842	.503
Salt	113	.61	5.98	1.92

From the above it is evident that the butter sent from the creameries was more moist than that entered in the competition. In the latter class of butter, the maximum percentage of moisture was under the lawful limit, whereas in the former it is nearly four per cent. above. It is, however, quite probable that the amount found in contest butter more truly represents the water content of the average butter.

In 1902, F. T. Shutt, Chemist of the Dominion Farms, determined the per cent. of water in 105 samples of butter from creameries in various parts of the Dominion and from warehouses at Montreal.* The average moisture content of all the samples was 12.31.

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* Department of Agriculture, Dairy Division. New Series.—Bulletin No. 4.

It is evident the butter was not all made for one market, for there is a very wide difference in the percentage amount of salt. The 5.98 per cent. obtained in the contest butter is abnormally high, but the three samples entered by the contestant were all very nearly the same, so that it would not appear that this was an accidental result.

The percentage of curd is much lower than that recorded from many American analyses. However, the results were got by following one of the official methods of the A. O. A. C., the nitrogen being multiplied by the factor 6.38 to obtain the curd. A few check determinations were made by digesting a sample of the whole butter, but no material difference in the results was obtained.

Each sample of the contest butter has been scored three times, at intervals of one month, by experts. It is our intention to study the results of the individual analyses with the method of manufacture, the quality, and keeping quality of the butter, and to report the results later.

UNCOMPLETED WORK.

Wheat and Flour. Last year some chemical work was done on Ontario wheats. The object of the work was to determine the best milling varieties and to ascertain from the differences in composition whether some scientific basis could not be found which would make the blending of the home grown varieties of wheat more profitable. At the request of the Millers' and Bakers' Associations, the Government decided to instal a milling and flour testing plant in the Chemical building. The machinery has been all purchased, but the addition to the Chemical laboratory in which it is to be placed is not completed. As the use of this plant will very much facilitate the investigation, we have postponed further work until it is installed.

Lodged Grain. On many farms throughout the Province, especially where clover occupies a prominent place in the rotation, a great deal of the cereal crops grow such a large amount of straw that they lodge, thus increasing the labor of harvesting and decreasing the value of the crop.

Last year a report was made of the composition of soils taken from where the crop of oats lodged and where it was not lodged. This year further data of this nature has been obtained. We have also determined the difference in the distribution of the nitrogen and ash constituents in the straw and grain in the lodged and unlodged crop. We have also conducted experiments with fertilizers to ascertain whether the lodging can be prevented by the increasing of the supply of ash constituents, and thus balancing the plant food available to the crop. A considerable amount of data has been accumulated, but more must be gathered before a definite conclusion can be reached. In the meantime no report will be made on the work.

Soaps. At the request of the Department of Household Science, we analysed thirteen samples of soap. The results show that some of the higher priced soaps are not of a sufficient high quality to warrant the price asked. The results of the analyses are not included in this report, as it is thought advisable to gather fuller data, and at some future time prepare a bulletin on the composition of the ordinary soaps, with notes on their use by the Department of Household Science.

Respectfully submitted,

R. HARCOURT.

DECEMBER 4th, 1906.

THE LECTURER IN CHEMISTRY AND GEOLOGY.

To the President of the Ontario Agricultural College:

SIR,—I beg to submit herewith a brief report of my work for the year 1906.

During the first four months of this year, my time was almost wholly occupied in teaching. To ensure thoroughness in the work of elementary Inorganic Chemistry, the first year students of the regular course perform the experiments for themselves, under my direction. This course of laboratory work is supplemented by lectures, in which the experiments are reviewed, observations made regarding the properties of the elements and compounds, and accurate conclusions pointed out. In this my endeavor has been, to make the work as interesting as possible by drawing the attention of the students to the practical application of the science of Chemistry to Agriculture.

In the Third Year, students proceeding to the examination for the B.S.A. degree are given a more advanced course of lectures in Inorganic and Physical Chemistry. To supplement lectures in this branch, the students are given a four months' course of laboratory practice in Qualitative Analyses, in which the principles underlying the grouping and separation of the metals are studied carefully.

The Chemistry taught the Dairy Class is of a practical nature. The object of this course is not to train men to be chemists, but to give students of the dairy industry a reading knowledge of books relating to their own line of work; to show them the reasons for the changes that occur in milk and its products; and to encourage a spirit of inquiry and thoughtfulness. As in the other courses in Chemistry, the practical work is supplemented by a course of lectures, dealing with the composition of milk, the detection of adulterants, and the use and effectiveness of preservatives, etc., etc.

The course in Geology is specially planned for the purpose of giving our students of Agriculture a practical knowledge of the origin, nature, and composition of soils. The geological history of North America is studied, and special attention is paid to the soils of the Canadian region.

INVESTIGATIONS UNDERTAKEN.

EXPERIMENTS IN ANIMAL NUTRITION.

In the realm of nature, the office of the plant is to store up energy from the sun's rays in certain complex compounds, setting oxygen free in the process; while the animal takes these compounds and utilizes the latent energy which they contain for its vital processes, the substances themselves uniting again with the oxygen from which they were separated in the plant. The compounds first break up in the cells of the body, independent of oxygen, in accordance with the laws which regulate vital phenomena and give out part of the latent energy which they contained. Then the oxygen of the air, carried by the blood to every part of the body seizes on the resulting substances, and burns them, more or less rapidly, producing a large quantity of heat to replace that which the body is constantly losing by radiation or otherwise, while the products of this burning are finally excreted from the body. A living animal, then, is constantly decomposing and oxidizing the materials of its own body. The body is thus continually suffering a loss of material. To replace this loss, as well as to supply material for further growth, is the office of the food fed to the animal.

It is obvious that so long as a country is only sparsely populated, and the needs of the people are amply supplied under a comparatively simple system of agriculture in which extended area precludes the necessity for improving methods, there would be little inducement to study the feeding of animals, or to systematize practice in regard to it. But as population increases in proportion to area, there arises the necessity for increased production over a given area. With this increased production a greater variety and a much greater quantity of home-produced stock feeds become available, and with means of transportation, various kinds of feeds are imported into the country, and the number of animals fed is very much increased. With these changes come keener competition, and, therefore, the necessity for more attention being paid to the subject of animal-feeding. Therefore, to supply feed in the most economical manner becomes of the utmost importance in the feeding of farm animals.

In England, with the object of cheapening the production, special attention has been paid to the improvement of breeds of farm animals, not only to enhance the development of the most valuable characteristics in the final product, but to secure early maturity, and thus to economize in the expenditure of food. Very little systematic work was undertaken to determine the use and adaptation of different feeds, each feeder relying largely on his own judgment. In Germany, however, much more attention was paid to the character of the food than to that of the animal, and towards the end of the eighteenth century and the beginning of the nineteenth, much time was devoted to determining the comparative values of different feeds, and tables were constructed, in which, adopting hay as the standard, it was attempted to arrange all other feeds according to their supposed value compared with that standard. The plan was to give the amount of each food which it was estimated was equivalent in food value to 100 parts of hay.

The first comprehensive tables of "hay values" were constructed by Thaer, and were published by him in 1809. These "hay values" were based partly upon the determining of the supposed constituents of the different foods, and partly on direct feeding experiments.

About 1830 Boussingault commenced his investigations. While Thaer looked at the question of the feeding of farm animals almost exclusively from the practical point of view, Boussingault studied it mainly from the standpoint of the chemist; though he, at the same time made direct experiments with farm animals, and so arranged and conducted them as to supply data which might serve both for the explanation and for the improvement of agricultural practice.

Thus, besides contributing much towards a better knowledge of the actual and comparative value of different foods, he investigated the question whether animals either availed themselves of the free nitrogen of the air as a source of some of their nitrogen, or eliminated either free or combined nitrogen by the lungs or skin; also whether the fat stored up by the fattening animal was exclusively derived from the already formed fat of the food, or whether it was produced within the body from other constituents of the food.

The first great advance made by Boussingault was, however, to determine the nitrogen in a large number of different foods; and taking the amount of it for the time being as a best measure of nutritive value, on this basis to compare them with hay. That is to say, supposing 100 parts of average good hay to contain a certain amount of nitrogen, how much of each of the other foods would be required to supply the same amount of it. Further, he selected a few typical articles of food for comparative feeding experiments, so as to be able to compare the results obtained both with those indicated by theory according to their contents of nitrogen, and with the estimates of others founded chiefly on somewhat similar practical trials.

He brought together in a table the estimates of the value compared with 100 parts of hay, seventy-six different articles of food according to the amount of nitrogen he found in them; and side by side he gave the hay value of the foods according to the published estimates of others, and to the results of his own practical determinations.

Later on Boussingault pointed out that what was still wanting was the determination of the amount of the various non-nitrogenous constituents also, and of how much of them was digestible and how much indigestible. Eventually he determined in ninety different food stuffs, not only the nitrogen, but the mineral matter, the woody fibre or cellulose, the fatty matter and the remaining non-nitrogenous matter, which he recorded as starch, sugar, and allied bodies. These results he arranged in tables, and then showed the amount of each food required to contribute the same quantity of nitrogenous substances as 100 parts of hay. In 1842 Luby published his work entitled "Chemistry in its Application to Physiology and Pathology." In it he treated of food in its relations to the various demands of the animal body. He was impressed, as was Boussingault, with the fact that nitrogenous constituents were both essential and characteristic of the animal body, and that they must, therefore, be supplied in the food consumed. He also concluded that the comparative values of food stuffs were, as a rule, measurable by their richness in nitrogen.

The importance of the nitrogenous compounds in the food makes the metabolism of nitrogen one of the most essential processes of nutrition. In all metabolism experiments, therefore, the determination of nitrogen is of fundamental importance. It is commonly assumed that where the nitrogen balance is measured by the determinations of nitrogen in the food and drink on the one hand and the excretions of the kidneys and intestines on the other, an accurate balance of the income and outgo is obtained. It has, however, been claimed that some of the excretory nitrogen leaves the body in the form of gas, that is, that some of the nitrogenous material of the food or of the body substance may be so decomposed in the body that nitrogen is liberated and leaves the body in the free state.

As the study of metabolism has advanced, these two opinions regarding the excretion of nitrogen have been bitterly fought for by their defenders. Voit and his followers of the Munich school have sought to prove that practically all excreted nitrogen leaves the body in the urine and feces; Seegen of Vienna and others have, on the other hand, insisted that considerable nitrogen may be excreted in the form of gaseous products.

Voit claimed that if the organism is in nitrogen equilibrium, exactly as much nitrogen is excreted in the urine and feces as is consumed in the food, provided the animal does not gain or lose in weight. There is no chance for an excretion of nitrogen in the gaseous respiration products. The discrepancies between income and outgo are attributed to unavoidable errors in experimental methods. That this reasoning may be depended upon, the balance of mineral matter, sulphur, and phosphorus would seem to prove, since in these cases there would manifestly be no question of gaseous excretion.

Seegen believed that when a discrepancy occurred between the consumed nitrogen and that excreted in the urine and feces, it was due to a gaseous excretion of nitrogen and not to errors in methods.

Some of the very early investigators, among others Regnault, Resait and Boussingault, claimed to find proof of a gaseous excretion of nitrogen. This nitrogen did not make any great impression on the experimenters or others at the time, but gained prominence many years later when all metabolism work was being examined to prove or disapprove a theory. Voit points out many probable sources of error which were not understood and guarded against at the time these experiments were made.

In the spring of 1868 or 1869 Voit went to Vienna and worked with Seegen for several weeks. Experiments were made with dogs. Voit collected the excreta directly, and succeeded in obtaining uniform daily results. Seegen's results showed considerable daily variation. It seemed as though Voit had finally settled the controversy and shown that Seegen's conclusions were based on errors due largely to the fact that he had not collected all the urine. Seegen, however, was not convinced, yet the fact remains that Voit got more uniform results, and uniformity of results is an important factor. If there is a discrepancy in the nitrogen balance due to respiratory excretions, it should be nearly the same for each day, provided the food and other experimental conditions are constant. Since that time a vast number of experiments, chiefly with dogs, have been made by Voit in conjunction with Bischoff and later with Pettenkoffer.

A consideration of the work as a whole brings out two principal points:

(1) Before analytical methods were perfected a considerable discrepancy between the nitrogen consumed and that excreted was usually found. It was often too great to be accounted for on the ground of a gain in weight of the subject. The discrepancies were, however, not at all regular, and as methods have been perfected the amount has decreased.

(2) In a considerable number of respiration experiments a gain of nitrogen, which was believed to come from gaseous respiratory products, was found in the respired air. Improved methods have greatly diminished the amount, and it is believed that errors in method or observation are sufficient to account for the remainder.

The majority of investigators to-day share Voit's opinion that all metabolized nitrogen is excreted in the urine and feces. Furthermore, since the nitrogen of the feces is largely due to the undigested residue of the food, the urine may without serious error be assumed to contain practically all the metabolized nitrogen. This fact is of great importance, for if it is not correct, then all the experimenting done up to the present time is defective, and our whole theory of nutrition in so far as it is based upon inquiries in metabolism requires revision; for, on this basis, it is customary to calculate the amount of flesh that could be formed from a given amount of food. By deducting the weight of nitrogen of the urea in the urine from the weight of the food digested the difference is the amount of nitrogen that has been retained in the body and has been used in the formation of flesh.

As stated previously, Liebig and Boussingault claimed that flesh, or the nitrogenous part of the body, could only be formed from the nitrogenous part of the food fed. This has been confirmed by many experiments since that time. The question naturally arises: What laws regulate the formation of flesh?

A large part of our knowledge of the laws of the formation of flesh is due to the labors of Voit at Munich, at first in conjunction with Bischoff, and later, alone and with Pettenkoffer. These investigators have made a great number of experiments, chiefly with dogs, determining the gain and loss of flesh and the total amount of protein decomposed in the body, and to them belongs the honor, both of having established reliable methods of investigation and of having applied them successfully to the solution of the important question of the effect of food on the gain or loss of flesh.

These laws were first studied with reference to the carnivora; but they are essentially the same for herbivora. The various species of animals differ in the food which they eat as well as in their powers of digesting certain foods; but the real nutrients, which are absorbed from the digestive system, even under the most varied systems of feeding, are always the same; and the substances once resorbed and taken up into the circulation decompose or are deposited in the body according to the same laws.

In considering the laws of flesh formation, there are two parallel processes to be distinguished. In the first place, in every living organism a certain quantity of albuminoid matter is daily destroyed in the vital process, and its nitrogen appears as urea, etc., in the urine. The amount of protein or flesh thus destroyed may vary greatly in different animals, or in the same animal at different times, but it can only cease entirely with the cessation of life, and cannot sink below a certain minimum amount without serious derangement of the vital functions. This continual and necessary process is called protein consumption. This must not be confounded with the amount consumed by the animal in its food. It denotes a very different thing.

In the second place, from a sufficient and suitable fodder more protein may be resorbed into the circulation than is needed to supply the consumption under the given circumstances, and this surplus produces a deposition of protein and becomes part of the body. Evidently, whatever decreases the protein consumption and increases the amount deposited in the tissues is so much protein gained by the body.

Voit claimed and proved by a large number of experiments that the protein of the living body exists in two forms—a comparatively stable one, which decomposes slowly, and an easily decomposed one whose amount depends on the food and which is rapidly destroyed when food is withheld. The quantity of the latter is small as compared with that of the former. Voit designates the stable protein of the body as organized protein, and considers that it makes up the mass of the organs; while the variable protein and easily decomposed quantity he calls circulatory protein.

The amount of circulatory protein in a poorly nourished body is small, not amounting in hunger in one per cent. of the weight of the organized albuminoids, but its amount is increased by an abundance of protein in the food. But be the quantity of circulatory protein large or small, the greater part of it, generally seventy to eighty per cent., is consumed in the course of twenty-four hours, and an exactly corresponding quantity of nitrogen excreted in the urine as urea, etc., while of the organized protein consumption of more than .8 per cent. is consumed. Therefore, the protein consumption of the body takes place almost wholly at the expense of the circulatory protein.

It is not always possible to distinguish accurately between the consumption and the production of albuminoids in the body; frequently the two increase or decrease simultaneously, and often one varies inversely as the other. The same amount of food may cause a loss of flesh in one case and a gain in another, and a corresponding variation will be observed in the protein consumption. This can only be explained by a difference in the previous food. Where, by an abundant supply of albuminoids, a large amount of circulatory protein has been formed in the body, a decrease of the albuminoids of the food will cause a decrease in the protein consumption, but not to an amount corresponding to the decrease of supply; the animal will lose flesh. On the other hand, an increased supply of albuminoids will cause an increase in the protein consumption; but the increase, like the decrease in the other case, will not be proportional to the increased supply, and a gain of flesh would result.

This gain or loss of flesh does not usually continue long. Within a short time—usually two to four days—the consumption of protein in the body becomes equal to the amount supplied in the food, and no further gain or loss of flesh takes place. For example, Voit fed a dog 1,800 grams of meat per day. After equilibrium with the supply had been established he increased the amount of meat to 2,500 grams per day. The extra 700 grams caused a very rapid increase in the protein consumption till in three days they were nearly equal again. The gain of flesh would be small, for very nearly all the additional 700 grams per day was converted into circulatory protein and rapidly destroyed.

Many experiments have been made with both carnivora and herbivora, all of which have given the same results, viz.: the animal body puts itself, after a longer or shorter time, into equilibrium with whatever quantity of albuminoids it receives in the fodder above that necessary to maintain it in average condition. That is, a certain minimum quantity of albuminoids is necessary to prevent starvation of the animal. An increase of the supply above this quantity causes a slight gain of flesh for a short time, but a rapid increase in the amount of circulatory protein and consequently in protein consumption; and, finally, exactly as much nitrogen is excreted in the urine (and milk) as is taken in the food.

It will be seen, then, that it is only as the establishment of nitrogen equilibrium is retarded that any considerable amount of flesh can be formed.

A moderate supply of salt in the daily food increases the flow of the active juices in the body, and consequently, the protein consumption.

It is not advisable to give animals too much salt, as they are then inclined to drink too much water, with a resulting increase in the consumption of albumen and an increased destruction of valuable food material, especially when the excess of water is not retained in the tissues but is rapidly excreted by evaporation or in the urine.

The rapidity with which equilibrium is established varies directly as the amount of albuminoids in the food and inversely and as the amount of fat contained in the body; in general, therefore, equilibrium would be more rapidly established in the carnivora than in the herbivora.

The fat stored in the body reduces the protein consumption, and therefore favors the laying on of flesh. The absolute quantity of fat is not so important in this respect as its proportion to the flesh of the body. It has been found that with an equal quantity of flesh, the protein consumption in the body is small when the animal is fat. For this reason the laying on of flesh is most easily done by herbivora, since they are especially adapted for producing fat, and even under ordinary conditions of feeding have much more fat in their bodies than carnivora. On this account it is often possible to increase the proportions of albumen in the food of herbivora with the most satisfactory results.

The reduction of protein consumption through the addition of fat in the food is not very great. Voit found, as a result of a large number of experiments with carnivora, that it amounted to on the average of 7 per cent. of the total consumption. With herbivora the retarding influence is not so evident because the action is hidden by the larger amount of carbohydrates they consume.

Carbohydrates have, if anything, a greater economizing influence on the protein consumption than fat. Herbivora take an enormous quantity of carbohydrates in their normal food, and on this account they require little albumen to maintain their condition, so that on a rich diet a proportion of the digested albuminoids readily remains on the body and is stored up in the organs as organized protein. A certain minimum of albuminoids, however, must be present in the food of cattle, and cannot be replaced by any other food constituent. The most important and difficult problem which the science of feeding is slowly solving is that of determining this minimum for all the purposes for which farm animals are kept, and that of fixing the necessary quantity and best proportions of nitrogenous and non-nitrogenous materials in the daily food of an animal, in order that the loss by protein consumption may be reduced to a minimum.

In America the investigation has fallen into two sub-divisions, viz., digestibility of feeding stuffs and more recently their "energy" values. The digestibility of a great number of the different coarse foods under average conditions has been determined at many of the Experiment Stations in the United States, but we find few, if any, records of the digestibility of some of the by-products from flour and cereal mills. This line of work has engaged our attention during the past two years, and is, we think, worthy of our best efforts. For it must be remembered, that only that portion of the food which is digestible is of direct use to the animal.

The following tables show the composition of the foods used in the experiments, and the digestibility of the different constituents of the food. We hope that feeders of live stock will make a careful study of such data.

COMPOSITION OF FEEDS USED IN EXPERIMENTS.

	Moisture	Nitrogenous matter	Ether Extract	Crude Fibre	Nitrogen Free Extract	Ash
	%	%	%	%	%	%
Oat dust, sample I	6.69	9.78	5.74	18.16	55.13	4.50
" " " II	7.17	10.97	5.53	22.60	47.49	6.24
Pea bran, sample I	7.60	9.56	2.99	27.86	49.11	2.89
" " " II	7.93	12.00	.55	22.28	54.36	2.88
Brewer's grain	6.52	14.62	6.63	12.83	58.07	1.33
Barley dust, sample I	10.42	12.64	1.33	13.95	56.98	4.68
" " " II	9.21	14.08	1.95	9.39	61.62	3.75
Corn meal	9.21	11.63	4.83	3.25	69.53	1.55
Ground oats	8.57	11.12	3.35	11.65	60.77	4.54
Wheat bran	10.52	15.23	4.37	10.31	54.12	5.45
Dried molasses beet pulp	2.71	8.81	1.14	1.46	79.54	6.34
Green corn	77.16	1.77	.43	7.15	12.17	1.32
Field cured corn	59.18	3.14	.82	12.27	22.63	1.96
Ensilage	76.68	1.87	1.02	6.81	11.84	1.34
Oat straw	10.21	3.90	1.91	35.81	42.96	5.21
Oat hulls	8.08	2.16	.89	28.13	53.92	6.80
Corn bran	9.52	5.63	1.53	26.82	55.26	1.24
North Feed	8.15	5.00	1.89	19.59	63.07	2.30
Mixed chop	9.79	13.25	2.97	9.10	59.99	4.90
Mill feed	6.41	8.06	3.51	18.33	57.58	6.11
Clover hay	13.59	11.72	2.35	24.56	41.84	6.04

AVERAGE DIGESTIVE CO-EFFICIENTS.

Food and Animal.	Protein.	Fat.	Fibre.	Nitrogen free Extract.
Oat Hulls, Steer	51.39	92.13	59.10	83.81
Oat Dust, Sample I, Sheep	66.05	76.19	....	76.07
" " " II, "	70.25	81.82	34.43	62.96
" " " III, Steers	64.90	73.51	30.14	61.07
Corn Meal, Sample I, "	79.81	94.80	83.92	88.48
" " " II, "	81.46	90.41	94.61	88.96
" Bran " "	52.24	67.17	25.75	68.19
Clover Hay, Sheep	70.08	52.32	31.19	66.43
North Feed, Steers	73.02	91.23	72.04	79.21
Mill Feed "	55.26	66.95	48.99	72.28
Green Corn Fodder, Steers	68.25	85.31	87.12	78.59
Field Cured Corn, "	35.89	83.85	71.29	85.85
Corn Ensilage, Steers	55.81	61.69	74.25	74.88
Oat Straw, "	36.81	74.99	41.73	70.27
Mixed Chop, "	73.27	49.63	51.04	69.44
Brewer's Grains "	77.34	95.28	52.98	72.88
Barley Dust, Sample I, Steers	60.49	86.53	41.73	52.29
" " " II, "	59.82	60.20	32.74	56.98
Ground Oats, Steers	66.83	97.20	53.22	81.09
Dried Molasses Beet Pulp, Steers	65.59	9.45	86.03	78.56
Wheat Bran, Steers	75.18	66.47	56.75	74.96
Pea Bran, Sample I, Sheep	59.33	93.54	64.16	81.80
" " " II, "	72.98	68.24	72.19	73.41

A detailed account of the experiments whereby these digestion co-efficients were obtained will be given in bulletin form.

FEEDING VALUE OF BEET PULP.

In this Province there have been few investigations made on the feeding value of beet pulp, simply for the reason that it has never been used here. In the United States, however, where the beet sugar industry has been in operation for a number of years, there has been some very valuable information gained regarding the value of beet pulp as a stock food. The pulp has been fed by our neighbors to the south for several years, and in the vicinity of some of the beet sugar factories, the raising of live stock has now become an occupation where no such business had existed previously.

Farmers are apt to underestimate the value of the pulp during the first few years of beet raising, and the practice due to such a belief results in great waste. We have on good authority the following statement of the use of beet pulp at the Michigan factories: "At the present time (1900) all the factories in operation in Michigan are giving the pulp free to the patrons of the factory. Up to this time not one per cent. of them have availed themselves of the opportunity. The pulp is now being dumped at a short distance from the factory (where it is left to decay). . . . The Bay City factory has put in a new process recently by which it proposes to dry the pulp after first mixing it with the refuse molasses of the factory. This for the present they expect to ship to Europe, there to be used as cattle food." But some of the farmers have seen their folly in losing this product and are now feeding the pulp with profit, and at the same time are conserving the fertility of the soil.

Unless the value of beet pulp is appreciated by the growers of sugar beets in Ontario, a waste of stock food and fertility similar to that at the Michigan factories, is likely to occur. If this article will assist in preventing this wholesale loss, its purpose will be achieved.

When fresh, beet pulp has the appearance of pulped roots; it is the residue after the pulped beet has passed through the process for the extraction of sugar. It contains from 88 to 91 per cent. of water. But beet pulp is not simply the sugar beet minus its sugar content; other substances than sugar are removed. Fodder analyses of two samples of beet pulp, from the Berlin factory, and a sample of the factory portion of whole beets selected at the O. A. College give the following results:

Sample.	Per 100 pounds dry matter.			
	Ash lbs.	Protein lbs.	Crude Fibre lbs.	Nitrogen free extract lbs.
Beet pulp (unfermented)	4.47	10.43	14.35	70.75
Beet pulp (fermented)	4.08	10.02	17.99	67.91
Average	4.28	10.22	16.17	69.33
Whole Beet (factory portion)	5.68	11.46	5.28	77.98

It will be noticed that both the ash and protein content of the beet are diminished by the process of sugar extraction. It will be noticed, also, that the nitrogen free extract is diminished, while on the other hand the crude fibre has vastly increased in proportion to its dry weight. The increased content of crude fibre renders the pulp less digestible than the beet proper.

Owing to the fact that beet pulp is turned out during but a small portion of the year, much of it should be preserved in the silo so that the period of its use may be extended. In his report to the Ontario Legislature, President G. C. Creelman, who has spent some time in the State of Michigan, investigating the beet sugar industry there, says: "The pulp makes a valuable cattle food. It can be fed in the fresh state or preserved in silos. I see, however, many difficulties in the way of farmers making ensilage of beet pulp. When the pulp is fresh, it is quite moist, and consequently, heavy. In order to fill a silo, large quantities would be required, and a number of teams would have to be engaged so that the silo might be filled ready for covering in a comparatively short time; otherwise, as each load was deposited in the silo, it would turn brown and begin to decay. When the next load was deposited, a brown streak of decayed matter would be left between, and so on to the top of the silo."

When the beet pulp is made into silage, several losses occur. According to the experiments* of Maercher and of Kühn, fresh beet pulp compares with beet pulp silage as follows:

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* Sach's Revue Universelle des Progres de la Fabrication du Sucre 1, 428.

Constituents.	Per Cent. Composition.			
	Maercher.		Kühn.	
	Fresh Pulp.	Pulp ensilage.	Fresh pulp.	Pulp ensilage.
Water	89.77	88.52	88.9	87.5
Dry matter	10.23	11.48	11.1	12.5
Ash	.58	1.09	.9	.9
Fat	.05	.11	.1	.1
Crude fibre	2.39	2.80	2.5	3.0
Crude protein	.89	1.07	.9	1.2
Nitrogen free extract	6.32	6.41	6.7	7.3

The per cent. composition, however, does not tell the whole truth, for "Maercher (Sucrerie Belge, Vol. II., page 464) determined that siloed pulps, in addition to losing water, also lost a considerable portion of their total dry matter. This is shown in the following statement of the analysis of pulps which were siloed for five months, in which time they lost the following percentages of the total amount placed in the silo. Thirty-seven and eight-tenths of nitrogen free extract, 25.5 of nitrogenous matter, and 29.6 of the fibre which they contained. The pulps gained, on the contrary, in fact, owing to the lactic and butyric fermentations. The losses were due to decomposition and not to extrainment in the moisture loss."

There is evidently a considerable loss in the total moisture, and this explains why, in the foregoing table, there is a gain in the percentage of the various nutrients. But this gain in per cent. would be very much greater were it not for the loss by decomposition of the various nutrients in the dry matter. The loss of silage, due to decay in the top layer, which acts as a cover for the material below, must also be taken into account. According to many experiments with various siloed foodstuffs, the digestibility of these foods is slightly lower than that of the same fodders when fed fresh. By siloing them there is a considerable loss in the feeding value of the total quantity of pulp.

In America little investigation has thus far been made regarding the per cent. of digestible nutrients contained in the pulp. It is our purpose to determine the digestion co-efficients of the different forms of beet pulp (fermented and unfermented) in order to be able to compare it with the foods mentioned in an earlier part of this report. If European digestive co-efficients are applicable to the digestibility of the nutrients in the beet pulp of America, beet pulp compares with common fodders on the basis of their digestibility as follows:

Name of Feed.	Moisture per 100 lbs. dry matter.	Digestible nutrients in 100 lbs. dry matter.				
		Protein.	Carbo-hydrates.	Ether Extract.	Total.	Nutritive ratio.
	lbs.	lbs.	lbs.	lbs.	lbs.	
Beet Pulp	900	6.44	71.76	....	78.20	1 : 11.1
Sugar Beet	809	7.07	76.01	....	83.08	1 : 10.75
Corn Silage	400	4.30	54.07	3.35	61.72	1 : 14.3
Mangels	733	12.08	59.34	1.10	72.52	1 : 5.0
Turnips	942	10.52	75.78	2.10	88.40	1 : 7.65
Bran	12	13.87	44.55	3.07	61.49	1 : 3.7
Clover Hay	17	8.00	42.12	2.00	52.12	1 : 5.83
Alfalfa Hay	9	12.00	43.51	1.32	56.83	1 : 3.83

The total digestible matter per 100 pounds dry matter in pulp is slightly lower than in the sugar beet itself or in turnips, but based on our analyses, it is higher than in corn silage and mangels. The nutritive ratio of the pulp is slightly narrower than that of corn silage; slightly wider than that of the sugar beet; and much wider than that of the mangel or turnip.

Let us now compare beet pulp with the feeding standards for fattening cattle and milch cows, as compiled by Henry in "Feeds and Feeding":—

	Per 1,000 pounds live weight.					
	Dry matter.	Digestible Nutrients.				
		Protein	Carbohydrates.	Ether Extract.	Total.	Nutritive ratio.
	lbs.	lbs.	lbs.	lbs.	lbs.	
Fattening Cattle.............	30	3.0	14.5	0.7	18.2	1 : 5.4
Milch Cows..................	32	3.3	13.0	0.8	17.1	1 : 4.5
Beet pulp (30 lbs. dry matter)..	30	1.95	21 74	....	23.69	1 : 11.1

By comparison with these feeding standards, it will be seen that beet pulp is not a well-balanced fodder. It contains less digestible protein, but more digestible carbohydrates and total digestible nutrients than the standards indicate. Furthermore, when 30 pounds of dry matter in the beet pulp is used, there is fed with it (if in the fresh state) about 270 pounds of water, or 9 pounds of water to each pound of dry matter. Warrington states that, with sheep, the normal proportion of water to the dry food is about 2 : 1, and with cattle 4 : 1. He states also that an excess of water always produces a waste of food. Beet pulp, then, contains a superabundance of water.

It is evident from its nature and composition that beet pulp is best used as a fodder, not when fed alone, nor when fed with rations with a wide nutritive ratio, but rather when fed with rations narrow in their nutritive ratio, and with a low water content. "Bran, clover, and alfalfa hay are complementary feeding stuffs to beet pulp for balancing the ration."*

A glance at the above table will show that where the digestible nutrients in beet pulp are deficient,—as in protein,—the three complementary foods are especially abundant; in the respects that the pulp is superabundant—as in water—the complementary feeds are quite different as compared with the feeding standards. By mixing these fodders in the proper proportions, the feeding standards may be readily attained. The bulky nature of the pulp, due to its watery character, and its high content of crude fibre, indicates that its best use is to serve as a food for ruminants—cattle and sheep. This statement is also borne out by the experience of practical feeders.

To the feeder, the moisture content of the pulp is not merely water; it is the beet juice, which gives the fodder a special value, when fed with a dry ration, out of all proportion to the dry matter in pulp. Pulp is a succulent food, and it is largely owing to this quality that it deserves such a prominent place in the ration. A ration composed of dry fodders is rendered more digestible by adding a reasonable quantity of pulp. Succulent foods also make rations more palatable, and hence animals will eat them more readily. By the use of the pulp, stock may be made to eat a larger quantity of cheap rough feeds. The opinion that succulent foods have a beneficial influence upon the health of the stock, and also upon the quality of the meat, has been confirmed.

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*Henry, "Feeds and Feeding."

The digestible nutrients in the dry matters, therefore, do not indicate the full value of the beet pulp.

Two successful experiments in feeding beet pulp at the Cornell University Experiment Station, resulted in the following conclusions, as published in Bulletin No. 183:

"The cows as a rule ate beet pulp readily, and consumed from 50 to 100 pounds per day, in addition to the usual feed of 8 pounds of grain and 6 to 12 pounds of hay.

"The dry matter in beet pulp proved to be of equal value, pound for pound, with dry matter in corn silage.

"The milk producing value of beet pulp (90 per cent. moisture) as it comes from the factory is about one-half that of corn silage (80 per cent. moisture). Beet pulp is especially valuable as a succulent food, and where no such food is obtainable it may prove of greater comparative value than is stated above."

The results obtained by Hall Station (Germany) in its feeding tests with beet pulp indicate that with cows eighty-eight pounds of pulp per day with a uniform quantity of grain and hay caused the largest flow of milk, and with steers the same amount of pulp gave the best returns, while a larger quantity materially reduced the gain.

A summary of the results obtained at the Michigan Agricultural Experiment Station, as published in Bulletin No. 193, is as follows:

(1) "The experiments at this Station, combined with the experience of practical farmers, show that steers, milch cows and sheep are fond of beet pulp.

(2) In an experiment on the farm of A. W. Wright, when steers were fed with the object of carrying them through the winter with as little outlay as possible, and where the ration was made up of mixed hay, shredded corn stover, and grain, one lot of 30 steers had pulp while a second lot of 20 steers had the same ration of hay, stover, and grain, but no pulp. It required per day and steer with the pulp fed lot, 55 pounds of pulp, 8.5 pounds of mixed hay, 4 pounds of shredded corn stover, and 2.4 pounds of the ground grain. On this ration the steers made an average daily gain of 1.42 pounds. The lot receiving no pulp had for a daily ration 11.5 pounds of mixed hay, 8 pounds of shredded corn stover, and 2.4 pounds of grain, and made a daily gain of .684 pounds. Comparing the amounts of food consumed by each pen to produce a hundred pounds of gain, and computing from this data the value of a ton of pulp as an additional succulent fodder, the tests show that under the conditions existing, a ton of pulp, fed with the other feeds of the ration, took the place of 421.5 pounds of corn stover, 27.4 pounds of mixed hay, and 68.8 pounds of grain. Practical feeders will naturally wait for the confirmation of these figures by further experiments before basing their operations upon them.

(3) In the experiment on the farm of A. M. Todd, a herd of 20 steers of mixed breeding, and in poor condition, was divided into two lots, to one of which was given a ration of mint hay, somewhat mouldy but palatable, wheat bran or oats, and corn meal; while to the other lot was given the same ration, and beet pulp in addition. The latter lot made an average daily gain of 2.52 pounds, while the steers which had no pulp made a daily gain of 1.84 pounds. Making the computations as before to find the estimated value of a ton of pulp, we find that under the conditions existing at Pearl, a ton of pulp took the place of 244 pounds of mint hay, 32.6 pounds of wheat bran, 296 pounds of corn meal, and 27.2 pounds of oats. During the last week of

this experiment the lot of steers having no pulp were off feed and made no gains. If, for this reason, the experiment were brought to a conclusion a week earlier, the estimated value of the pulp would be reduced approximately by one-third. These figures result from a single experiment, and must, therefore, await confirmation before being taken as the statement of the Station in the matter.

(4) Where, in this last experiment, two lots of ten steers each were fed the same kind and amount of dry feed for six weeks and to the ration of one lot pulp was added, the feeding of 13.775 pounds of pulp gave an increased gain of 280 pounds.

(5) When fed to milch cows at the College with mixed hay and a grain ration of two parts of bran to one of corn, the pulp added nothing to the yield of butter fat. It increased somewhat the milk flow."

In reviewing the numerous letters of feeders and farmers reporting their experience in feeding beet pulp, we notice that in the following particulars they are all agreed:

Beet pulp is especially adapted for the dairy cow.

It is also relished by steers and sheep, and proves a valuable addition to their rations.

Beet pulp that has been frozen should be fed with caution.

The addition of the beet pulp to the ration has a healthful influence upon the animals to which it is fed.

COMMERCIAL FEEDING STUFFS.

NAME OF FOOD.	Crude Protein	Moisture	Ether Extract	Crude Fibre	Ash	Nitrogen Free Extract
Ground Screenings	17.44	8.82	11.09	8.78	7.25	46.62
Ground Feed	12.94	10.11	4.78	7.79	3.48	60.90
Malt Combings	20.88	11.79	2.32	12.56	5.74	46.71
Linseed Meal	28.37	7.62	22.61	6.70	4.53	30.17
Barley	11.31	13.23	1.33	5.18	2.27	66.68
Barley Dust	9.27	10.42	1.03	13.95	4.68	60.65
Oatmeal Feed	11.65	7.04	7.82	3.42	2.81	66.76
Whole Wheat Flour	15.67	10.02	3.98	5.76	3.25	61.32
Gold Dust Corn Meal	7.47	11.52	5.37	.52	.69	79.43
Beet Pulp, unfermented	.93	89.95	.14	2.29	.37	6.32
" " fermented	1.50	88.87	.21	3.55	5.42	.45
Ground Barley	12.93	10.62	3.56	11.61	4.00	57.28
Wild Oats	8.25	9.42	5.20	18.53	2.72	55.88
National Chop	11.90	11.49	12.40	16.43	2.68	45.10
Dairy Chop	9.00	9.90	3.63	19.08	4.64	53.75
Hog Chop	8.69	11.40	3.64	12.09	3.25	60.93
Bran, adulturated, Sample No. 1	10.62	9.55	4.55	13.94	5.10	56.24
Bran, adulturated, Sample No. 2	11.50	10.20	4.61	12.87	4.80	56.02
Puritan Chick Food	12.26	8.57	7.10	5.93	6.20	59.94
Crushed Peas	22.65	12.42	3.09	6.21	2.55	53.08
Pea Meal	26.08	9.51	2.76	5.75	2.95	52.95
Sample Feed No. I	7.81	7.33	3.35	24.73	7.38	49.40
" " II	8.06	6.41	3.51	18.33	6.11	57.58
" " III	9.75	7.11	3.44	23.83	6.83	49.04
" " IV	11.31	6.27	5.43	15.29	5.01	56.69
" " V	7.38	5.68	3.17	21.76	7.63	54.38

Attention has repeatedly been called to the desirability of some official system of inspection and analysis of the feeding stuffs sold in Canada, and which will compel the manufacturer or vendor of these products to attach to each bag or parcel a tag bearing a guarantee of the amount of protein and fat contained in the feed. This matter was discussed at some length in the Experimental report of last year, and is only here again brought forward for the reason that recent analyses have furnished an excellent illustration of the force of this contention.

During the year the materials, the composition of which are given in the table above, were forwarded to us for analysis. It is quite unnecessary to enter into any detailed discussion of the results in order to make good the point under consideration. A casual review of them with reference to the percentages of protein and fat will assure the reader that, as these are the two most important constituents of feeding stuffs, the feeding values and the market prices of these foods are not in accord.

Wheat bran is probably one of our best by-products. It contains protein, fat, ash, and soluble carbohydrates in such proportion as to make it an exceedingly valuable component of a dairy ration. We regret to say, however, that the two samples of bran analyzed were heavily adulterated by finely ground oat-hulls.

Several states of the Union have already enacted laws for the regulation of the sale of concentrated commercial feeds, and it seems to me, in view of the facts furnished by the chemical analysis of these feeds, that public opinion in Canada will not only support, but demands, legislative action on the part of the Government.

Respectfully submitted,

W. P. GAMBLE.

December 3rd, 1906.

PART VIII.

THE PROFESSOR OF VETERINARY SCIENCE.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to herewith submit my annual report for the year 1905-1906.

CLASS ROOM.

The class room work has been much the same as in previous years.

First Year.—To this class during the fall term I gave a course of lectures on Veterinary Anatomy, briefly considering the anatomy of the horse and ox. When possible, we verified description by the examination of the skeleton of the horse or the living animal. During the afternoon lectures we discussed the erection of horse stables as regards site, drainage, material, ventilation, kinds, arrangement and size of stalls, floors, mangers, feed boxes, etc., also the general care of horses as regards feeding, watering, working, grooming, etc., and the care of harness, vehicles, etc. This was followed by a course in judging horses, in which we discussed the desirable characteristics of the different breeds and classes, and compared the respective merits of different animals of the same breed or class.

During the winter term I gave a course of lectures on "Veterinary Materia Medica" in which we discussed the properties, actions, uses and doses of the various drugs used for the prevention and cure of the ordinary diseases to which farm stock is subject. We also discussed the different methods of administering medicines, with the advantages and disadvantages of each.

Second Year.—The class room work for this year during the fall term consisted in a consideration of the causes, symptoms, and treatment of the ordinary diseases of and accidents to farm stock, with frequent reference to the proper care, methods of feeding, watering, etc., in order to prevent disease. During these lectures I usually have a living horse in the class room and explain the changes in general appearance caused by disease or injury. We also have specimens of diseased bone, by which we are able to explain the changes that take place during disease.

During the winter term I gave a course of lectures on "Veterinary Obstetrics," treating of the phenomena of conception, gestation and parturition; the usual causes of sterility and the means by which some of them can be removed; the diseases of both sexes due to the act of reproduction; the general hygienic treament of pregnant animals; the causes of difficult parturition with the means for their removal; the causes, symptoms, and treatment of diseases of both dam and offspring incident to and following parturition, and paid special attention to the care of the young.

During the afternoons I gave a course of lectures and demonstrations on the practical methods of handling horses and colts, securing animals for minor operations, as dissecting out tumors, lancing abcesses, dressing and stitching wounds, castrating, firing spavins, ringbones, etc., applying blisters and bandages; extracting and dressing teeth, scarifying lampas, etc. I illustrated the methods of applying bandages, stitching wounds, administering medicines, passing a probang in an ox; puncturing an ox in case of excession, bloating, etc., etc.

I also gave to this class a course in "horse judging," using for the purpose the horses at our command, borrowing some and visiting neighboring studs.

Third and Fourth Years.—With these years we continued the course in horse judging.

Special Dairy Class.—To this class I gave a short course of lectures on the causes, symptoms, and treatment of the ordinary diseases of dairy cattle.

Short Course in Stock Judging.—This course, which was held in January, was well attended, and as usual we gave a course of practical scoring and judging in the different classes and breeds of horses. In this I was ably assisted by Wm. Smith, Esq., of Columbus, Ont. I wish to take this opportunity of publicly thanking those gentlemen who so kindly supplied horses of the different classes for scoring and competition, viz.:—Messrs. Sorby, Bowman, Atchieson, McCannell, Hurley, Tovell, Stewart, Smith, and others.

Purchase of Horses.—During the winter the department purchased three Clydesdale mares, supposed to be in foal. Two of them proved to be in foal, but with one, when the period of parturition arrived, great difficulty was experienced in delivery. The foetus was deformed and malpresented with several of the joints ossified. We succeeded in effecting a delivery, but the mare died the next day. The other pregnant mare produced a good colt. Both mares have been bred and are supposed to be in foal. The addition of these mares to our stock of horses materially improves our opportunities for class room work.

DISEASES AND INJURIES TO STOCK.

Horses.—We had a few cases of the ordinary diseases in horses, as colic, indigestion, wounds, influenza, laryngitis, under-run sole, lymphangitis, scratches, eczema, sore necks and shoulders, etc., but no fatal cases except the one already mentioned.

Cattle.—We had one fatal case of gangrenous mammitis, one fatal case of phrenitis and one fatal case of parturient apoplexy. We also had a few cases of indigestion, difficult parturition, retention of the placenta, sore teats, foul in feet, uterine discharge, etc., all of which recovered.

Sheep.—We had little trouble with the sheep except from injuries by dogs, from which cause several died and others had to be destroyed.

Swine.—We had little trouble with the swine and no fatalities except in newly born ones.

Respectfully submitted,

J. H. REED.

GUELPH, NOVEMBER, 1906.

PART IX.

THE PROFESSOR OF DAIRY HUSBANDRY.

To the President of the Ontario Agricultural College:

Sir,—I beg leave to submit my sixteenth annual report of the Dairy department of the College. As usual I am under obligations to the excellent staff of assistants and instructors in the dairy for their valuable help during the year. We are also indebted to the Chemical, Bacteriological, and Farm departments for assistance at various times.

The work in the Dairy department consists of two main features—the teaching of dairying to students by means of lectures and practical work and the conducting of experiments in dairying for the benefit of the dairy industry. As the first must of necessity be very similar year after year, this part of our work does not require any lengthy report. During the fall term a course of lectures and practical work in farm dairying is given to the first year students. To the second year students a similar course is given in co-operative or factory dairy work. The specialists in dairying of the fourth year take lectures and practical work throughout the College year, although there is not much opportunity for practical work during the months of January, February and March, while the special dairy school is in session, as all of our apparatus and rooms are in use at this time by the special classes.

There were seventy-four students in attendance at the Short Courses in dairying during the year. This does not include about twenty young ladies from the Macdonald Institute who took dairying as an optional subject during the winter, nor does it include a number who came to the Dairy from time to time for some special instruction in milk-testing, or some other branch of dairying. These students usually remain for but a short time, not more than a day or two, yet they receive many lessons of value to them in their practical work on the farm, in the factory, or in the City Dairy.

Thirteen students applied for diplomas in cheese and buttermaking from the Dairy School during the past year. They have passed their examinations at the school, have sent monthly reports to the Dairy Department of the College and have been in charge of a factory for at least two years, one of which must be after taking the Dairy School Course. Their factories have been inspected by some one representing the school, or where this is not practicable we obtain a report from the owner of the factory, a buyer, or some other person in whom we have confidence. To visit each applicant would mean a heavy expense for travelling.

Name.	P.O. Address.	Diploma.
Geo. F. Agur	Jarvis, Ont.	Cheese-making.
T. D. Bathgate	Eganville, Ont.	Butter-making.
W. W. Dool	Bishop's Mills, Ont	Cheesmaking.
W. H. Friend	Columbus, Ohio	“
Miss Birdie Gilholm	Bright, Ont.	Butter-making.
H. V. Godoy	Argentine Republic	“
V. A. Hooper	Fayetteville, Ark.	Butter and Cheese.
T. Herbert Lund	George, Iowa, U.S.A.	Buttermaking.
Geo. Matheson	Shellmouth, Man.	“
Wm. J. Murphy	Hickson, Ont.	Cheese-making.
A. J. O'Hara	Rupert, Que.	Butter-making.
R. W. Stratton	Guelph	“
F. A. Whimsett	Cumberland, Ont.	Cheese-making.

EXPERIMENTS IN BUTTER-MAKING.

GENERAL NOTES.

Both milk and cream are delivered to the Dairy department of the College by farmers living in the vicinity of Guelph. These are purchased at a certain rate per pound of milk fat. The price varied during the last year from 18 to 25 cents per pound of milk fat delivered at the Dairy. In the case of patrons delivering whole milk, they receive in addition to the foregoing prices, either 85 pounds skimmilk for each 100 pounds whole milk delivered, or, in case they do not wish skimmilk, they are paid ten cents per hundred pounds whole milk in addition to the usual price paid for fat. We require that all milk and cream shall be delivered sweet and of good flavor. At the beginning of the season a notice was sent to all prospective cream patrons, giving the prices for the season that would be paid for sweet cream testing not less than 25 per cent. fat. It was further stated on the notice, that all cream having over .25 per cent. acid and testing less than 25 per cent. fat would be paid for at the rate of one cent per pound fat less than the standard price. We think this notice tended to improve the quality of the cream that otherwise might have been delivered. The milk sent into the creamery is separated by means of a power separator at a temperature of 90 to 100°F. The cream drops from the cream spout of the cream separator into the supply can of a pasteurizer. The cream delivered by patrons, after weighing and sampling, is also put directly into the pasteurizer, and under ordinary circumstances the cream delivered and the ceam separated at the creamery are pasteurized at one and the same time. In special experiments the two kinds of cream are pasteurized separately.

The skimmilk is elevated to a tank in the attic by means of a pump where it is pasteurized with the exhaust steam from the engine before it is returned to the farmers. The skimmilk is divided among the patrons by means of an automatic skimmilk weigher.

From the pasteurizer, where the cream is heated to 180 to 185°F., it passes over a cold gas cooler in summer and over a water cooler during cold weather. If ripened cream butter is made, the cream runs from the cooler into a cream vat, and has about 20 per cent. culture (starter) added and is churned next day in a combined churn and worker. The butter is churned in the usual way and either put up in 28 or 56 pound boxes or in pound prints which are placed in cold storage until sold, or, in the case of experiments, until the lots were scored one to three times. As noted in the report further on, a number of lots of butter were shipped during the past season to London, England, per Messrs. Hodgson Bros. & Rowson, of Montreal. All butter was scored according to the following scale: Flavor, 45; grain, 25; color, 15; salt, 10; package, 5; total, 100. In most cases full points were allowed for "package."

During the College term, from Sept. 15th to the middle of April, it is practically impossible to do any experimental butter work as the time of the men, the machinery and most of the raw material are taken up with teaching students practical butter-making. In the month of June there is little opportunity for investigation, owing to the large number of visitors which we have during this month. In consequence of these things there is not much time during the year for actual experiments relating to butter-making. However, we are able to do some work which we trust will be of value to the creamery industry. The work would be of more scientific value if more chemical and bacteriological work were done in connection with the experiments. If possible to make satisfactory arrangements, we beg leave to suggest that a chemist and a bacteriologist be appointed who would devote all their time to dairy problems. It has been suggested that we should cooperate with the Dominion Department of Agriculture—the College to furnish the laboratories and the Dominion Department the men. This is done by the U. S. Department of Agriculture at Washington, with several of the stations and colleges in dairy states and with very satisfactory results.

BUTTER SHIPPED TO LONDON, ENG., PER HODGSON BROS. & ROWSON, OF MONTREAL.

Early in January of the present year, we made arrangements with one of the members of the firm of Hodgson Bros., now Hodgson Bros. & Rowson, of Montreal, to take charge of certain experimental butters which we purposed making during the season of 1906. This firm entered very heartily into the proposed arrangement and we are deeply indebted to them for their interest in the experiments and for many courtesies extended. The London, England, branch of the firm were also very kind and gave every assistance possible in carrying out the plan. It is a very difficult matter to secure attention from British firms to small lots of either cheese or butter. Their primary object in handling dairy goods from Canada, or from anywhere else, is to make profit, and there is very litle profit in handling these small lots. Our previous experience in shipping experimental butters to English markets had shown us the extreme difficulty of securing satisfactory reports from the firms who handled the goods in England. We are glad to be able to present more details this year than we have been able to get heretofore. We should have liked a few more details, especially on certain lots, but found it impossible to get them. If there were a Canadian Agent in London whose duty it would be to get information, more detailed in character than that usually sent out, it would be an advantage to all concerned. Most of the published reports are too general and not specific enough to enable the butter or cheese-makers to get at the cause of any trouble which may arise. We realize that detailed reports may be somewhat difficult to get, where there are thousands of boxes of cheese and butter coming into a market like London, weekly, yet we doubt not if the right man were on the spot he could glean information of great value to the Canadian Dairy Industry.

PLAN OF EXPERIMENTS.

There were three main points under consideration, viz., the relative merits of butter made from sweet pasteurized cream churned without culture (starter), butter made from sweet cream pasteurized, having about 20 per cent. culture added just before churning, and butter made from ripened cream. In connection with the three main experiments there were five minor series: *(a)* Washing butter with brine and also brine and borax water; *(b)* half ounce salt added per pound of butter; *(c)* half ounce of salt and one-quarter per cent. common borax per pound of butter; *(d)* half ounce salt and one-quarter per cent. of an English butter preservative; *(e)* half ounce salt and one-quarter per cent. of a Canadian butter preservative. These five minor series of experiments were carried on in conjunction with the three main series relating to sweet cream with and without culture and ripened cream, making thirty experiments altogether on these points. Fifteen more experiments were made with the sweet and ripened cream, in which the salt was left out of *c*, *d* and *e*—preservatives only, in dry form, being used. Altogether there were forty-five distinct experiments and different lots of butter made in these tests which were conducted during the months of June, July, and August, 1906. During June and July the butter was shipped weekly to Montreal. During August shipments were made every two weeks. After scoring in Montreal they were forwarded to London, England.

A brief outline of one series will probably make them all clear. Series I. related to sweet cream which was churned immediately after separating the whole milk, pasteurizing, and cooling the cream. Most of our supply of cream is separated from whole milk delivered by farmers who live about the College. A small amount of cream separated on the farms is also delivered, and this was mixed with the cream separated from whole milk, then pasteurized and cooled. From the cooler the cream was conveyed directly into a combined churn by means of a conductor. After all the cream had been pasteurized, cooled, and run into the churn, the churn was given a few revolutions to mix the cream and then it was allowed to stand about two hours.

The cream was usually about 48° to 56° F. when run into the churn from the cooler, and about 50° to 52° F. when churning began—usually after dinner. The churning was made in a combined churn in the usual way. The butter was about the size of wheat grains when the buttermilk was drawn off. After washing once with cold water, the butter in the (*a*) lots was washed a second time with either brine (common salt dissolved in water) or brine and borax water (common borax dissolved in water). One ounce of salt was dissolved in one and a half pounds water when making the brine. Brine and borax water was made by dissolving a quarter pound borax in brine for 100 pounds butter.

After draining and working the butter was packed in 56 pound boxes and placed in an ice cold storage at a temperature of about 40° F. The (*b*) lots of butter had common salt at the rate of one-half ounce of salt per pound of butter added after washing. The *c*, *d* and *e* lots were treated the same as the (*b*) lots, except that one-quarter per cent. of common borax, one-quarter per cent. of an English butter preservative, and one-quarter per cent. of a Canadian butter preservative were added to the respective lots. All lots were otherwise treated as nearly alike as possible. In most of the experiments the churnings of the respective lots were made on consecutive days, the order being reversed at each trial. In the last test of the series each lot in the main series was made from the same churning so far as possible. This will be shown later under the discussion of details.

Series 2 and 3 were made similarly to series 1, except that series 2 was made with sweet cream to which about 20 per cent. of culture had been added for about two hours before churning; and series 3 was made with cream ripened in the usual way in a cream vat for about 20 hours before churning. The acidity of the cream at the time of churning in this latter series would be about .5 per cent., reckoned as lactic acid.

Two experiments were made comparing results from cream delivered by patrons as compared with butter made from cream separated at the College Creamery on the same days as the cream was delivered. All were churned sweet.

Three lots, or churnings, were made in which the butter was put up in pound prints, enclosed in "Cartons" and shipped in 24 pound cases. One lot of each was made from sweet cream, sweet cream having 20 per cent. culture added two hours before churning, and one lot from ripened cream. All were practically saltless, having been washed in brine and borax water.

TABLE SHOWING CHIEF POINTS IN THE MANUFACTURE OF THE EXPORT BUTTER MADE AND SHIPPED TO LONDON, ENG., 1906.

No. of Churnings.	No. of 96 lb. Boxes.	Average % Fat in Cream Churned.	Average Temp. for Churning Cream.	Average No. of minutes required for Churning.	Average % Fat in Buttermilk.	Average % Acid at Churning.	Average % of moisture in Butter.	Kind of Cream from which Butter was made.
12	41	31.1	50.3°F.	20.8	.31	—	13.513	Sweet Cream
13	46	27.8	50.1°F.	23.7	.26	—	14.052	Sweet Cream + culture
11	39	30.1	51.4°F.	24.2	.26	.48	13.941	Ripened Cream
2	2	25.5	51. °F.	22	.26	—	13.552	Gathered Cream, churned sweet + 20 % culture
2	6	26.2	50.5°F.	19	.28	—	13.891	Cream separated at College Creamery and churned sweet + 20 % culture

DISCUSSION OF RESULTS IN MANUFACTURING.

The preceding table shows that the precentage of fat in the cream at the time of churning ranged from an average of 25.5 to 31.1 per cent. fat. The average churning temperature ranged from 50.1° F. for sweet cream containg about 20 per cent. culture, to 51.4° F. for the ripened cream lots. The average time required for churning varied from 19 to 24.2 minutes. Contrary to the generally accepted opinion the lots made from sweet cream required less time for churning than did those made from ripened cream. The average percentage of fat in the buttermilk tended to be somewhat higher in the lots churned from sweet cream. Two lots of sweet cream contained an exceptionally high percentage of fat in the buttermilk (over one per cent.) and are not included in the table of averages. One lot of the sweet cream containing about 20 per cent. culture had also a high fat content (.75 per cent.) in the buttermilk, and is not included in the average of results, as we were unable to explain why these high tests should have occurred in these three cases. The tendency, however, seems to be for too great a loss of fat in the buttermilk from churning sweet cream, although we have many churnings that are as exhaustive from sweet cream as from ripened.

The percentage of moisture is fairly constant in all the lots. The highest percentage of moisture in any one sample of butter was 16.19. This was made June 7th, by churning sweet cream (having about 20 per cent. culture added before churning) testing 23 per cent. fat, at a temperature of 48°. The granules of butter came in a very fine condition so that a part of the buttermilk had to be drawn off before the butter would gather. It was then churned to about the size of corn and washed with tap water at about 53° F. The butter was salted a half ounce per pound. The lowest percentage of moisture in any one sample was 11.9. This sample was made July 19th, from ripened cream and also salted a half ounce salt per pound of butter.

The granules of butter were chiefly the size of wheat and peas. Some were massed larger. After rinsing with tap water the butter was washed in water at 50° F., and afterwards worked in the usual way, being given 17 revolutions in the "Success" combined churn and worker.

The amount of salt retained by the butters washed in brine varied from .175 to .37 per cent. The lots salted half ounce salt per pound of butter ranged from 1.74 to 1.9 per cent. salt in the samples tested.

TABLE SHOWING THE AVERAGE OF THE SCORES OF THE BUTTERS AS GIVEN BY MESSRS. HODGSON BROS. & ROWSON, MONTREAL.

KIND OF BUTTER.	Flavor 45	Grain 25	Color 15	Salt 10	Package 5	Total 100	No. of Expts.	Remarks.
Sweet Cream washed in brine	44	24.5	14.5	10	5	98.5	2	
" " + 20 % culture washed in brine	43	25	14	10	5	97.	2	Color trifle high.
Ripe Cream washed in brine	43.5	24	14	10	5	96.5	2	
Average of lots washed in brine	43.5	24.5	14.1	10	5	97.3	6	
Sweet Cream washed in brine and borax	44	24	15	10	5	98	1	
Sweet Cream + 20 % culture washed in brine and borax	43	25	15	10	5	98	1	
Ripe Cream washed in brine and borax	44	24	14	10	5	97	1	
Average of lots " " "	43.6	24.3	14.6	10	5	97.6	3	
Sweet Cream salted ½ oz. per lb.	41.5	24.3	13	9.3	5	93.3	3	
Sweet Cream + 20 % culture ½ oz. per lb.	42.6	24	13	9.3	5	93.3	3	
Ripe Cream salted ½ oz. per lb.	40.3	22	13	9.6	5	90	3	Heated flavor
Average lots salted ½ oz. per lb.	41.5	23.4	13	9.4	5	92.2	9	
Sweet Cream, ½ oz. salt, ¼ % borax	40	24	11.5	9.5	5	90	2	Two colors
Sweet Cream and 20 % culture, ½ oz. salt, ¼ % borax	40.5	24.5	12.5	9.5	5	92	2	
Ripe Cream, ½ oz. salt, ¼ % borax	43	23.5	13.5	9.5	6	95.5	2	
Average of lots salted ½ oz, salt and ¼ % borax	41.1	24	12.5	9.5	5	92.8	6	
Sweet Cream, ½ oz. salt and ¼ % (1) Eng. P.	40.	23.5	11	9.5	5	89	2	Cloudy, off flavor
Sweet Cream, + 20 % culture, ½ oz. salt and ¼ % Eng. P.	41.	24.5	12	10	5	92.5	2	
Ripe Cream, ½ oz. salt and ¼ % Eng. P.	42.5	23	12.5	9	5	92	2	Cloudy, flavor fair
Average of lots ½ oz. salt and ¼ % Eng. P.	41.1	23.6	11.8	9.5	5	91.1	6	
Sweet Cream, ½ oz. salt and ¼ % (2) Can. P.	43	24.5	12.5	9.5	5	94.5	2	Trifle cloudy
Sweet Cream, + 20 % culture, ½ oz. salt and ¼ % Can. P.	42.5	24.5	12	10	5	94	2	Cloudy
Ripe Cream, ½ oz. salt and ¼ % Can. P.	42	22.5	12.5	9	5	91	2	Cloudy, flavor greasy
Average of lots ½ oz. salt and ¼ % Can. P.	42.5	23.8	12.3	9.5	5	93.1	6	
Average of Sweet and Ripened Cream with ¼ % borax only	43	24	15	10	5	97	3	
Average of Sweet and Ripened Cream ¼ % (1) Eng. P. only	43	24.3	15	10	5	97.3	3	
Average of Sweet and Ripened Cream with ¼ % (2) Can. P. only	43	24.3	15	10	5	97.3	3	
Average of all lots from Sweet Cream	42.2	24.1	13.6	9.6	5	94.7	15	
Average of all lots from Sweet Cream + 20 % culture	42.5	24.6	13.7	9.9	5	94.5	15	
Average of all Ripened Cream	42.8	22.4	13.8	9.7	5	94.8	15	
Average of Gathered Cream lots churned sweet, washed in brine and borax water	41.5	24	14	10	5	94.5	2	
Average of lots made from cream separated at College Creamery, churned sweet, washed in brine and borax water	41.5	24	14	10		94.5	2	

Discussion of the Results in Quality of Butter.

The preceding table gives the results of the scoring of the different lots of butter by the Montreal firm to whom the lots were sent and by whom they were forwarded to London, England.

The two lots made from sweet cream without any culture and in which the butter was washed in brine had the highest average total score, viz., 98.5 points out of 100. One of these lots was made in the month of June and one in August. The next highest average score of 98 was given to each of two lots—one made from sweet cream without culture and having the butter washed in brine and borax water, and the other made similarly except that about 20 per cent. culture was added to the cream before churning.

The lowest average total score (89) was given to two lots made from sweet cream having no culture and the butter of which was salted a half ounce per pound of butter and to which was also added a quarter per cent. of an English preservative. The second lowest average score (90) was also made from sweet cream, butter salted a half ounce per pound of butter and to which a quarter per cent. borax was also added. The third lowest average total score (91) was given to two lots made from ripened cream, salted a half ounce and containing a quarter per cent. of a Canadian preservative.

When we group the results from all three kinds of cream (sweet, sweet plus 20 per cent. culture, and ripened cream), we find that the lots made "saltless" by washing the butter in brine and borax water have the highest average total score, 97.6. The three lots—washed with brine only, lots in which one-quarter per cent. English preservative, and lots with one-quarter per cent. Canadian preservative—are equal and stand second with an average score of 97.3; while the lots with borax only are a close fourth, with an average score of 97.

When the scores from all the lots made from ripened cream are averaged we find the total points out of 100 to be 94.8. The lots made from sweet cream without culture score an average of 94.7 and those from sweet cream containing about 20 per cent. culture score 94.5. The average score of the two lots made July 30th and 31st from gathered cream was 94.5 and exactly the same total was given to similar lots made from cream separated from whole milk on the same dates at the College Creamery. It must be understood that the cream which was collected from the patrons of the College Creamery was delivered in a sweet condition and usually of good flavor. Samples of these lots were kept in the College refrigerator at a temperature of about 40°F. until October 13th, when it was found that the butter from the cream separated at the Creamery had held its flavor better than that made from cream collected from patrons. There was less of the "cheesy" flavor on the butter made from whole milk separated at our Creamery as compared with that made from gathered cream.

The results of the scorings previously given show the condition of the butter as it reached Montreal. After inspection at this port it was forwarded to London, England. We have detailed scorings for but two shipments after reaching London. One shipment consisted of three churnings, made July 24th, 25th, and 26th, from ripened cream in which one-half ounce salt per pound of butter and one-quarter per cent. each of borax, English preservative and Canadian preservative were used in the respective lots. All three lots wore given a score of 99 points each. The lot with salt and borax scored 45 for flavor and 24 for grain. The other two lots were given 44 each for flavor and 25 for grain. They were all given full points in the other qualities.

The second shipment, of which we received a full report from London, was a mixed lot sent out August 24th from Guelph, and consisted of churnings made August 10th, 11th, 20th, 21st, 22nd and 23rd, from sweet cream, sweet cream containing 20 per cent. culture and ripened cream. Contained in the shipment were sample boxes of butter made with brine, salt, borax, English and Canadian preservatives. All the lots scored from 97 to 100 points. Nine out of the fourteen lots scored perfection or 100. Fifteen lots were sent, but the report on one lot was lacking. In a written report the London firm states: "We find them all of very fine quality, and are pleased to say that one box only shows any trace of mould." The box reported as "mouldy" was made August 22nd from sweet cream, the butter having been washed in brine and no further salt added.

FURTHER EXTRACTS FROM CORRESPONDENCE WITH THE LONDON FIRM.

LONDON, Aug. 1st, 1906.

"O. A. C. Butters."

"We have carefully examined the 16 boxes, R 98 ex S/S 'Hurona' and find them all in perfect condition, and all fine in quality. The unsalted marked 9/26 (made from sweet cream and 20% culture, butter washed in brine and borax water) are particularly fine and show up better than any of the others. Those marked 30/6 (made from sweet cream without culture, salted ½ oz. and having ¼% Canadian preservative) are the cleanest and sweetest of the salted."

Signed, ROWSON, HODGSON & CO., LTD.,

LONDON, Aug. 17th, 1906.

"Our customer who bought these three lots has promised to give us some detailed account of the quality, but as far as we can see they are uniformly good of the salted and unsalted and it would puzzle us to make a special report on them, because they seem to be everything that we could wish for, and our buyer said practically the same thing on examination here."

Signed, ROWSON, HODGSON & CO., LTD.,

LONDON, Sept. 7th, 1906.

"As requested by you we have examined the O. A. C. Butters and have also tested their keeping qualities and herewith furnish you with our report: Salted, 7/24, 7/25, and 7/26 (made July 24, 25 and 26th, from ripened cream) we find very fine butters and their keeping qualities excellent. We have broken them up and exposed them for ten days to a temperature of from 72° to 78°F., and find not the least trace of rancidity. The saltless butters are also very fine in flavor and texture, but Nos. 7/30a, 7/30b and 8/30a (made respectively from gathered cream churned sweet and with culture and washed in brine and borax water; separator cream treated the same; and gathered cream churned sweet without culture and washed in brine and borax water) are lacking in aroma and all showing both red and blue mould, chiefly the latter, which is a grave fault and would become very serious should the butters be stored for a few weeks, especially in the case of 1 lb. prints, as each pound is showing mould. We do not think 1 lb. prints are suitable for our markets as the larger surface exposed to the air tends to deteriorate the quality of the butter, and we have found both New Zealand and Australian butters which have been sent over in pounds are generally more or less out of condition on the outside. We believe we have bought and handled all or nearly all of the O. A. C. butter and have invariably found them very fine, and until this last consignment (shipped from Guelph Aug. 19th) have found no trace of mould in the saltless and no fishiness in the salted."

Signed, ROWSON, HODGSON & CO., LTD.,

The foregoing extracts will give a fair idea as to how the different lots of butter were received on the London market. As previously stated, the pound prints were made from the lots of cream on August 4th, 8th and 9th, and were shipped from Guelph on August 10th. One lot was made from sweet cream, one from sweet cream containing about 20 per cent. culture, and one lot from ripened cream. All were saltless or practically so, as the butter was washed in brine and borax water and no further salt was added. So far as our reports indicate there was no difference in the quality of the butter on arrival, as they all appeared slightly rancid and showed some mould.

THE FINANCIAL RESULTS.

The chief object of the experiments was not to obtain a financial profit, yet we were anxious to see how the returns would compare with prices obtained in our local markets. We need also to bear in mind that each shipment consisted of from three to as many as fifteen different kinds of butter. The weight of each shipment varied from 11 boxes (616 pounds) to 22 boxes (1,232 pounds) which is a very small amount to ship so far. In consequence of the smallness of the shipments, the transportation and commission charges are likely greater than would ordinarily occur in shipping butter to the English markets. Altogether there were nine shipments made, totalling 8,128 pounds, or an average of 903 pounds per shipment. There was received net for these shipments $1,645.70, or an average of 20.2 cents per pound. In the case of two of the shipments there were special charges made which would not ordinarily occur.

The following table shows the statement of moneys received and expenses in connection with each shipment during the season:—

FINANCIAL DATA *re* SHIPMENTS OF BUTTER TO LONDON, ENG., PER HODGSON BROS. & ROWSON, MONTREAL.

Date of pment.	No. of Boxes.	Butter.	Price per 112 lbs. at which Butter sold in England.	Transportation and Commission Charges	Net amount received for shipment.	Net price received per lb. Butter.
		lbs.				c.
June 15	22	1232	106 shillings	$38.96	$240.47	19.5
" 22	16	896	106 "	27.83	175.41	19.5
" 29	16	896	108 "	27.29	179.52	20
July 6	16	896	110 "	27.51	187.60	20.9
" 13	14	784	110 "	23.85	160.15	20.4
" 20	12	672	110 "	20.16	137.15	20.4
" 27	11	616	112 "	24.15	122.78(1)	20
Aug. 10	19 (24 lb.) 11 (56 lb.)	1072	114 "	38.38	221.90	20.7
" 24	19	1064	116 "	32.64	220.72(2)	20.8

(1) Extra claim of £1 for insurance on previous shipment charged to this lot.
(2) Fee of $10.12 paid for inspecting and reporting on this lot.

CONCLUSIONS.

1. The sweet cream butter, both with and without culture added, churned in less time than did the ripened cream, although the churning temperature averaged about one degree lower for the sweet cream.

2. The percentage of fat in the buttermilk tended to run somewhat higher from the cream churned sweet as compared with that from ripened cream. On three occasions it was exceptionally high, but these results were not included in the table of averages because they were so abnormal. Butter-

makers who follow the plan of churning sweet, pasteurized cream need to be very watchful else an excessive loss of fat in the buttermilk will be the result. The temperature of the cream should not be above 50°F. when commencing to churn and the percentage of fat in the cream ought not to be more than about 25.

3. The average percentage of moisture in the butter was fairly constant, averaging 13.789 per cent. for the different groups. The lowest average percentage of moisture in any one series was 13.513 made from sweet cream. The highest average, 14.052 per cent., was in the series made from sweet cream containing about 20 per cent. culture added about two hours before churning.

4. The saltless butters received the highest scores for quality, and seemed to suit both the Montreal judges and the judges in London, England, better than did the salted. This may have been due to the salt we were using. In one of their letters the London firm say, "the samples of salted have an unpleasant flavor, which may be due to bad salt."

5. There appeared to be little difference in the quality of the butter made from cream churned sweet (with and without culture) and that made from cream ripened in the usual way.

6. There was little or no difference in the quality of the butter, as shown by the scores of the Montreal judges and as shown in reports from London, whether common borax, English or Canadian preservatives were used, both in addition to and without common salt. It would seem as if common borax is as effective as the more expensive butter preservatives commonly sold. The saltless butters made by washing the butter in brine and borax water obtained the highest average scores, though there was not much difference between the results of this and the other methods followed in making saltless butter.

7. The gathered cream lots of butter appeared to be equally as good as those made from cream separated at the creamery in the two trials made. However, there were scarcely a sufficient number of these to make a thorough test.

8. Shipping butter in pound prints to the British market is not likely to prove profitable—1. Because the English merchant seems to prefer having his own brand on such butter; 2. There is a tendency to "sideyness," or rancidity on the outside of prints before they can be sold to the consumer; and 3. Because the extra expense for packages as compared with 56 pound boxes is not likely to be recouped in the price obtained.

9. The financial returns, on the average, were not so good from the lots exported as from butter sold on the local markets. However, our local markets, especially in summer, are easily glutted, hence we must seek an outlet for our surplus. The best outlet at present available for Ontario creamerymen is the British market.

EFFECT OF DIFFERENT METHODS OF INCREASING THE MOISTURE CONTENT OF BUTTER, COMPARED WITH THE MOISTURE CONTENT IN REGULAR MAKE.

Last year we reported on one method which had been suggested as a means for increasing the moisture content of butter. Briefly, the method followed last year was to take from a large churning about 35 to 50 pounds of butter, and after placing this in a smaller churn (small "Simplex") it was washed, drained, salted and worked in the usual way. Another similar-sized lot from the same churning was washed by having a stream of cold water playing on the butter while it was being worked in the small combined churn and worker. The chief object of the experiment was to determine whether or not this method increased the moisture content of the butter. The results are indicated by a quotation from our last report: "The average percentage of moisture in the normal samples of butter was 12.925. The range was from 12 to 13.6 per cent. The samples treated by washing while the worker was in motion averaged 12.664 per cent. moisture. The range was from 11.4 to 13.6 per cent."

"Under the conditions given there was no increase in the moisture content or yield of finished butter as the result of allowing water to run on the butter while the rollers for working were in motion in the 'Simplex' churn." (O.A.C. report, 1905, p. 114.)

As the experiments referred to in last year's annual report were limited in number, five only, and the conditions not exactly the same as are found in ordinary churning, because small quantities of butter were transferred from a large churning to a small churn, it was planned during 1906 to conduct further investigations into the question of the effect of different methods of churning and handling butter, on its moisture content.

The work on this question began March 21st and concluded May 31st, 1906. During this time sixty-eight different lots of butter were made in order to test the effect of different methods. Not all these tests are reported upon, because all were not satisfactory. In any line of investigation a certain number of the experiments or tests are likely to prove unsatisfactory and cannot be used in making a summary of the work. Part of the work was done under the supervision of Messrs. Waddell and McDougall, Instructors in the Dairy School, and also Instructors among the factories during the summer season of 1906. Most of the work, however, was done by Messrs. Stratton and Taylor, who are employed as Instructors in the Dairy School during the winter and who have charge of the College Creamery during the summer.

The usual plan was to thoroughly mix a vat or vats of cream, then divide the cream into two, three or four lots, which were in most cases churned in a "Simplex" churn. The method of churning varied with each lot of cream. In a few cases the "Success" churn was used. After churning, washing, salting and working, samples were taken and sent to the chemical laboratory for moisture, salt and curd determinations. Samples were also marked for scoring, after which they were placed in an ice refrigerator at a temperature of about 40° F. These samples were judged by number on May 28th, June 14th, June 30th, and Oct. 13th, 1906. The judge knew the lots by numbers, only, and could not know the method of making at the time he was scoring.

During March and April a great deal of the work was preliminary. Beginning about May 1st, the work began to be better systematized and the results more satisfactory. We have made two groupings of the churning results—one including all the satisfactory experiments and one containing those only from May 1st. The report on the quality of the butter includes only those lots made from May 1st to 31st.

Table showing average results of the churnings from March 21st to May 31st, grouped according to ten different methods of churning and containing 63 experiments.

No. of Experim'ts.	Method of Churning.	Av. lbs. Cream per Churning.	Av. per cent. Fat in Cream.	Av. time of Churning.	Av. Temp. Cream at Churning.	Av. Temp. Butter Milk.	Av. per cent. Fat in Butter Milk.	Av. Temp. of Wash Water.		Av. No. of Revolutions of Worker.	Av. lbs. Fat in Cream per Churning.	Av. lbs. Butter per Churning.	Average per cent.			
								1st	2nd				Over run.	Moisture.	Salt.	Curd.
				Min	Deg F.	Deg F.		Deg F.	Deg F.							
16	Regular Butter Granules about size of wheat, temp. wash water above 50° F.	255.4	29	23.1	52.7	54.3	.148	53.3	53	13.5	69.55	83.2	19.6	13.142	2.463	.637
2	Regular, except that temp. of wash water was under 50° F.	282	26	44	47.5	51.5	.135	46.5	46.3	13.5	76.35	92.75	21.4	12.450	.....	....
4	Regular, except butter was massed in wash water, temp. above 50° F.	392.2	25.8	18	52.5	54.2	.203	55.5	55.1	13.2	113.56	134.81	18.7	14.42	2.340	.471
10	Butter granules small, temp. wash water above 50° F., washed with rollers in motion	228.5	29.4	22.5	52.9	54.7	.150	52.8	53.2	13	66.95	80.57	20.3	13.96	2.982	.660
6	Butter granules uneven, massed in wash water at temp. above 50° F.	362.8	29.4	31.3	50.5	52.7	.118	53.7	53.7	15	97	112.6	16	12.828	2.040	.645
4	Butter granules uneven, washed with rollers, temp. wash water above 50° F.	200	30.3	26.7	51.2	53.8	.131	56.2	57	12.5	59.2	71.3	20.3	13.120	3.740	.684
7	Butter massed in buttermilk, wash water above 50° F.	232.3	30.3	26	53	54	.123	53	53.1	13.4	70.7	83.7	18.4	12.62	2.850	.690
10	Butter massed in buttermilk, washed with rollers in motion, temp. wash water above 50° F.	264.9	28.8	24.2	52.4	54.5	.174	54.3	54.6	12.4	76.38	92.3	20.8	13.44	2.990	.644
3	Regular, except for light working	220	30.1	24.3	52.1	53.8	.126	53.6	54	9	66.4	78.91	18.8	12.90	2.530	.621
1	Regular, except butter was washed in brine and borax water	240	28.5	18	55.5	57	.130	51	51.5	13	68.4	80.50	17.6	15.22	.200	.701

DISCUSSION OF RESULTS OBTAINED FROM MARCH 21ST TO MAY 31ST, 1906.

The chief points to notice in the foregoing table are the effects of the ten methods of churning on the "overrun," "moisture," "salt," and "curd" in butter. In the first group, wherein our regular method was followed of churning the butter to about the size of wheat granules, drawing the buttermilk, rinsing off the butter with tap water to remove the buttermilk clinging to the grains of butter, washing the butter once or twice with water at about 50 degrees to 55 degrees F., then salting at the rate of ¾ ounce of salt per pound of butter and working 13 or 14 revolutions of the worker, we find that the percentage of "overrun" (butter in excess of fat in the cream) in individual churnings varied from 16.27 to 21.3, and averaged 19.6 for sixteen experiments. The percentage of moisture in the butter varied from 11.83 to 14.81, and averaged 13.142. The percentage of salt in the butter varied from 1.74 to 3.31, and averaged 2.463. The percentage of curd varied from .529, to .715, and averaged .637. It will be noticed that the percentage of curd is fairly uniform in all the butters from the various methods of churning.

The highest "overrun" is in the second group, viz., churning in the regular way and washing with water at a temperature under 50 degrees F., but as there are only two experiments in this group it may be well not to lay too much stress upon the results. The same applies to the last two groups, viz., "light working" and "washing in brine and borax water."

Leaving out of consideration those groups where the number of experiments in a group is under ten, we find that the group where the butter was massed in the buttermilk and washed, having the rollers in motion, with water at a temperature above 50 degrees, in some cases as high as 60 degrees, contained an overrun which varied in individual churnings from 19.47 to 21.52 and averaged 20.8—the highest of any of the larger groups. The per cent. of moisture in the butter of individual churnings varied from 11.19 to 15.5 and averaged 13.44.

Three other groups contain a higher average per cent. of moisture in the butter, indicating that the "overrun" does not depend altogether upon "moisture in the butter."

TABLE SHOWING VARIATION IN SINGLE CHURNINGS, ALSO AVERAGES FOR GROUPS, IN THE OVERRUN, MOISTURE, SALT AND CURD, IN MOISTURE EXPERIMENTS, MAY 1ST TO 31ST, 1906.

Method of Manufacture	Date	No. of Sample	Lbs. Butter per Churning	% Overrun	% Water	% Salt	% Curd
Group 1							
Regular Method...........	May 1	30	69.25	18.53	13.08	1.74	.676
" "	" 3	33	69.82	18.80	12.40	2.21	.638
" "	" 5	36	90.25	17.97	12.29	2.56	.689
" "	" 7	39	80.00	16.27	11.83	2.39	.650
" "	" 8	40	77.75	17.80	12.48	2.60	.689
" "	" 12	45	86.00	21.30	12.55	2.38	.529
" "	" 15	47	73.75	18.28	13.93	3.05	.701
" "	" 17	50	65.25	18.63	13.40	1.92	.567
" "	" 19	56	69.50	18.19	12.95	1.65	.618
" "	" 22	59	81.75	18.29	13.06	2.14	.606
" "	" 29	62	83.00	21.30	14.81	3.31	.708
" "	" 31	68	89.00	20.67	13.80	3.11	.567
Average (12 Expts.)......			77 94	18.83	13.05	2.42	.636
Group 2							
Overchurning in Buttermilk	May 1	32	70.00	21.52	12.78	2.38	.663
" " "	" 3	35	84.00	20.3	12.62	2.85	.663
" " "	" 29	64	82.00	20.	13.22	3.28	.740
" " "	" 31	66	89 50	21.35	14 21	3.09	.701
Average (4 Expts.)........			81.37	20.79	13.20	2.90	.691
Group 3							
Overchurning and washing with rollers in motion...	May 1	31	70.75	21.52	13.44	3.39	.676
" " "	" 3	34	85.00	21.70	13.33	3.89	.644
" " "	" 17	52	66.50	20.90	13.62	2.51	.542
" " "	" 19	54	70.25	19.47	13.41	2.17	.719
" " "	" 22	60	83.00	20.00	15.00	2.44	.628
Average (5 Expts.)........			75.10	20.71	13.76	2.88	.643
Group 4							
Wheat Granules and washed with rollers in motion...	May 5	37	92.25	20.58	13.81	3.65	.689
" " "	" 7	38	82.00	19.18	13.76	3.96	670
" " "	" 8	41	78.75	19.30	12.91	3.43	.576
" " "	" 12	43	86.25	21.69	15 00	2.80*	.663
" " "	" 15	48	74.00	18.70	15.04	2.41*	.638
" " " . ..	" 17	51	66.50	20.90	13.85	2.26	.593
" " "	" 19	55	70.25	19.47	13.25	2.03	.676
" " "	" 22	58	83.00	20.00	13.44	2.52	.727
" " "	" 29	63	83.00	21.30	14.54	3.37	.714
" " "	" 31	67	89.75	21.69	14.00	3.39	.638
Average (10 Expts.).......			80.57	20.28	13.96	2.98	.658
Group 5							
Churned to lumps in wash water	May 17	53	66.	20.00	15.14	1.97	.488
" " "	" 22	61	82.5	19.37	14.05	2.71	.455
Average (2 Expts.)........			74.25	19.68	14.59	2.34	.467

*(½ oz.)

DISCUSSIONS OF CHURNING RESULTS OBTAINED IN MOISTURE EXPERIMENTS, MAY 1ST TO 31ST, 1906.

In the preceding table we have five groupings of the results of the work done during the month of May, which includes thirty-three distinct experiments. In the first group, called “regular method,” where the ordinary practices of the Dairy were followed, there were twelve experiments in which 935.3 pounds of butter were churned. The size of the churnings ranged from 65¼ pounds to 90¼ lbs. and averaged 77.94 lbs. of butter per churning. The percentage of “overrun” (butter made in excess of fat in the cream) varied in the single churnings from 16.27 to 21.3 per cent. and averaged 18.83 for the group.

The moisture content of the butter varied from 11.83 to 14.81, averaging 13.05 for the group. The salt in the butter varied from 1.65 to 3.05 and averaged 2.42 per cent. for the group. The curd varied from .529 to .708 and averaged .636 per cent. for the group.

The second and third groups, overchurning in the buttermilk, and overchurning combined with washing the butter having the rollers in motion (about ten revolutions of the churn were usually given) and the water above 50 degrees F. gave the highest overrun, viz., 20.7 per cent. in both cases, but as in the former grouping for the whole period of the experiments, these increased “overruns” are not associated with the highest moisture content in the butter. The last group, churned to masses in the wash water, contains the highest moisture content in the butter. However, there are only two experiments in this group, and it may not be wise to lay too much stress on this limited number of tests. As the other factors, curd and salt, which naturally influence the “overrun” are fairly constant in all the five groups, we may naturally ask what is it that made an apparent increase of nearly two per cent. in the overrun of the second and third groups as compared with the first group? At present we are unable to offer any satisfactory explanation except that it may be due to errors in sampling, but why these should all seem to point in the same direction is not satisfactorily explained with our present knowledge of the subject.

TABLE SHOWING SCORES OF BUTTER MADE IN MOISTURE EXPERIMENTS, MAY 1ST TO 31ST, 1906.

Method of Manufacture.	Date of Making.	Date of Scoring.	Flavor 45	Grain 25	Color 15	Salt 10	Pkg. 5	Total 100
Group 1.								
Regular...........	May 1...	May 28....	40.	24.5	14.	10.	5.	93.5
		June 30....	39.	25.	15.	10.	5.	94.
“	“ 3...	May 28....	40.5	24.5	14.5	10.	5.	94.5
		June 30....	37.	25.	14.5	10.	5.	89.5
“	“ 5...	May 28....	41.	24.5	14.5	10.	5.	95.
		June 30....	38.	25.	14.5	10.	5.	92.5
“	“ 7...	May 28....	41.	24.5	14.0	10.	5.	94.5
		June 30....	39.	35.	15.	10.	5.	94.
“	“ 8...	May 28....	41.	24.5	14.5	10.	5.	95.
		June 30....	40.	25.	15.	10.	5.	95.
“	“ 12...	May 28....	41.	23.5	14.5	10.	5.	94.
		June 30....	39.	25.	14.5	10.	5.	93.5
		Oct. 13	39.	25.	15.	10.	5.	94.

Method of Manufacture.	Date of Making.	Date of Scoring.	Flavor 45	Grain 25	Color 15	Salt 15	Pkg. 5	Total 100
Group 1.—(*Con.*)								
Regular	May 15...	May 28....	41.5	24.5	14.5	10.	5.	95.5
		June 30....	38.	25.	15.	10.	5.	93.
"	" 17...	May 28....	42.	24.5	15.	10.	5.	96.5
		June 30....	40.	25.	15.	10.	5.	95.
"	" 19...	May 28....	42.	24.5	14.	10.	5.	95.5
		June 30....	40.	25.	13.	10.	5.	93.
"	" 22...	May 28....	42.	24.5	14.5	10.	5.	96.
		June 30....	39.	25.	14.	10.	5.	93.
		Oct. 13.....	39.	25.	14.5	10.	5.	93.5
"	" 29...	June 14....	41.	25.	13.	10.	5.	94.
		" 30....	40.	25.	15.	10.	5.	95.
"	" 31...	June 14....	42.	25.	13.	10.	5.	95.
		" 30....	41.	25.	14.5	10.	5.	95.5
Average of all.....	....	....	40.5	24.7	14.4	10.	5.	94.21
Group 2.								
Overchurning in Buttermilk...	May 1...	May 28....	40.	24.	14.	10.	5.	93.
		June 30....	37.	25.	14.	10.	5.	91.
" " " ...	" 3...	May 28....	40.	24.	14.5	10.	5.	93.5
		June 30....	38.	25.	15.	10.	5.	93.
" " " ...	" 29...	June 14....	42.	25.	14.	10.	5.	96.
		" 30....	40.	25.	14.5	10.	5.	94.5
" " " ...	" 31...	June 14....	42.	25.	14.	10.	5.	96.
		" 30....	40.	25.	15.	10.	5.	95.
Average of all.....	....	....	39.87	24.75	14.37	10.	5.	94.
Group 3.								
Overchurning and washing with rollers in motion...	May 1...	May 28....	40.	24.5	14.5	10.	5.	94.
		June 30....	38.	25.	15.	10.	5.	93.
" " " ...	" 3...	May 28....	40.	24.	14.5	10.	5.	93.5
		June 30....	39.	25.	14.5	10.	5.	93.5
" " " ...	" 17...	May 28....	41.5	24.5	14.	10.	5.	95.
		June 30....	40.	25.	14.5	10.	5.	92.5
" " " ...	" 19...	May 28....	41.	24.5	15.	10.	5.	95.5
		June 30....	39.	25.	15.	10.	5.	94.
" " " ...	" 22...	May 28....	42.	24.5	14.5	10.	5.	96.
		June 30....	39.	25.	14.5	10.	5.	93.5
		Oct. 13.....	38.	25.	15.	10.	5.	93.
Average of all.....	....	....	39.77	24.7	14.63	10.	5.	93.95
Group 4.								
Butter, size of wheat granules and washed with rollers in motion.	May 5...	May 28....	40.	24.5	14.5	10.	5.	94.
		June 30....	38.	25.	15.	10.	5.	93.
	" 7...	May 28....	41.	24.5	14.	10.	5.	94.5
		June 30....	39.	25.	15.	10.	5.	94.
	" 8...	May 28....	41.	24.5	14.5	10.	5.	95.
		June 30....	39.	25.	15.	10.	5.	94.
	" 12...	May 28....	41.	24.	14.5	10.	5.	94.5
		June 30....	40.	25.	13.	10.	5.	93.
		Oct. 13....	38.	25.	14.5	10.	5.	92.5
	" 15...	May 28....	41.5	24.5	14·5	10.	5.	96.5
		June 30....	39.	24.5	13.	10.	5.	91.5
	" 17...	May 28....	42.	24.5	14.5	10.	5.	96.
		June 30....	39.	25.	13.	10.	5.	92.
	" 19...	May 28....	41.	24.	14.5	10.	5.	94.5
		June 30....	39.	25.	13.	10.	5.	92.
	" 22...	May 28....	42.	24.5	14.5	10.	5.	96.
		June 30....	38.	25.	14.5	10.	5.	92.5
		Oct. 13....	39.	25.	14.5	10.	5.	93.5
	" 29...	May 28....	41.	25.	14.	10.	5.	95.
		June 30....	40.	25.	14.	10.	5.	94.
	" 31..	May 28....	42.	25	14.	10.	5.	96.
		June 30....	41.	25.	14.	10.	5.	95.
Average of all.....	....	....	40.06	24.75	14.18	10.	5.	94.

Method of Manufacture.	Date of Making.	Date of Scoring.	Flavor 45	Grain 25	Color 15	Salt 10	Pkg. 5	Total 100
Group 5.								
Churned to lumps in wash water...	May 17...	May 28....	42.	24.5	14.5	10.	5.	96.
		June 30....	40.	25.	13.	10.	5.	93.
" " "...	" 22...	May 28....	41.25	24.5	14.5	10.	5.	95.5
		June 30....	40.	25.	14.5	10.	5.	94.5
		Oct. 13	39.	25.	15.	10.	5.	94.
Average of all.....			40.25	24.8	14.3	10.	5.	94.6

MOISTURE IN BUTTER EXPERIMENTS.

The preceding table gives the results of all the scorings made in the experiments conducted from May 1st to 31st. Most of the lots were judged May 28th and June 30th. A few were scored on June 14th, and a few lots were carried through the summer to test their keeping qualities. These latter were scored Oct. 13th,—about five months after making. The object in all cases was to find the relative qualities of the butters made by the different methods when fresh, when made about one month, and after being kept for some time in a refrigerator. In all cases the samples consisted of pound prints wrapped in parchment butter paper in the usual way and designated by numbers.

In the table the average of all scores are given. Group 1, made in our regular way, scored the highest average for flavor, viz., 40.5, out of a possible 45. The average of all the first scores was 41.25; of the second scores 39.16; and of the third, 39. The average total of all the scorings for this group are 94.21 out of a possible 100.

The second group in which the butter was churned to masses in the buttermilk averaged 39.87 points for flavor. The average of first scorings was 41, and of the second 38.75. The first group lost an average of about two points in flavor during one month, while the second group lost 2¼ points. The average total score for the second group was 94.

In the third group we have overchurning and washing of the butter with the rollers in motion. The average score for flavor is 39.77. The average of first scores is 40.9 and of second scores 39. These lost 1.9 points in flavor during one month. The average total score is 93.95.

In group 4, where the butter was churned to about the size of wheat kernels, the buttermilk drawn, the butter rinsed and then washed with the rollers in motion, we find the average score for flavor to be 40.06. The first scores for flavor average 41.25, the second 39.2, and the third 38.5. The average of the total scores is 94.

Group 5, churning the butter to masses in the wash water, of which there are only two experiments, has an average score of 40.25 for flavor. The first scores averaged 41.75, the second 40, and the one lot kept until Oct. 13th, scored 39 for flavor. The total score in this group averaged 94.6 points out of a possible 100.

"OVERRUN" DEFINED.

A great deal of misconception is prevalent in the minds of butter-makers regarding what is meant by the term "overrun." With some, if at the end of the month they find that for every 100 pounds of butter made, 85 lbs. fat delivered in milk, or cream, or both, were required, they figure that the overrun is 15 per cent., whereas it is over 17½ per cent. Some figure the "overrun" on the basis of the fat in the cream churned, which is the plan followed in these expericments, but the creamerymen operating a whole milk, or cream gathering creamery, or a combined creamery, should figure his "overrun" on the fat delivered in the milk or cream, or both, and not on the cream as churned, because there is always some fat lost in separating at the creamery. There are also certain mechanical losses due to fat lost in handling the milk, or cream, or both. When, therefore, a butter-maker says he has an "overrun" of 20, 25 or 30 per cent., we may well ask him what he means, or how he figured the "overrun." It is impossible to have more than 25 per cent. overrun and make "legal butter." Assuming that the butter contains the maximum amount of water allowed by statute, viz., 16 per cent., this leaves four per cent. for salt, curd, etc., and 80 per cent. for fat, *i.e.*, in every 100 pounds of butter so made, there are only 80 lbs. of fat. Assuming that no fat is lost in the buttermilk and that there are no mechanical losses, 80 lbs. fat in the milk or cream would make 100 lbs. butter, which is an "overrun" of 25 per cent. Makers who claim an overrun of 30 to 40 per cent. (we have heard of one case where an overrun of 50 per cent. is claimed) should look to their methods of weighing, testing, etc., as there is evidently something wrong.

Conclusions.

1. The "overrun" may vary considerably from day to day when following the same method of churning as closely as possible. On May 7th, following the regular method of butter-making, the overrun was 16.27 per cent. The next day the overrun was 17.8 per cent. following practically the same method. On May 12th, when churning the butter to wheat granules and washing with the rollers in motion the overrun was 21.7 per cent. On May 15th, following the same method the overrun was 18.7 per cent., and on the 17th it was 20.9.

On April 24th, when butter was massed in the buttermilk the overrun was 16.5 per cent.; April 25th, it was 19.1 per cent., and on May 1st the overrun was 21.5 per cent.—same method followed in all cases.

These illustrations will suffice to show the variation in the "overrun" from fat in the cream. The variation would be more, based on the fat delivered in milk or cream because more factors enter the problem to cause a variation. However, after summing up the whole question and averaging all the results there would appear to be an increased "overrun" as a result of massing the butter in the buttermilk, or washing the butter in comparatively warm water with the rollers of the combined churn and worker in motion. That this is not always the case is illustrated in the experiments of May 29th, when the regular method gave an overrun of 21.3 per cent.; washing with rollers in motion, 21.3 per cent.; and overchurning in the buttermilk, 20 per cent. The percentages of moisture in these three samples of butter were respectively 14.81, 14.54, 13.22. The percentages of salt and curd were practically the same in all three lots. To find the amount of "overrun" at our creamery on individual days, several tests were made during the season. On April 20th, there was delivered in milk and cream, 225.18 lbs. fat. From this was made 266 pounds butter in prints. The total loss of fat in the skim-milk was .9 lb. The overrun was 18.1 per cent. The overrun on April 21st was 15.5 per cent. On May 3rd the overrun from the whole milk (4,819 lbs., testing 3.8 per cent. fat) and cream (165 lbs., testing 21.75 per cent.) was 15.06 per cent. from the churn and 13.24 per cent. in prints. The overrun from the fat in the cream vat was 20.3 per cent. from the churn, and 18.3 per cent. in print butter.

2. The percentages of moisture, curd, and salt in the butter do not appear to bear a constant relation to the percentage of "overrun." For example, in the grouping of all the experiments we find the highest average percentage of moisture (15.22), the highest average percentage of curd (.701) and the lowest percentage of salt (.20) combined with the lowest average overrun (17.6). However, this is only one experiment. The lack of salt may also have had something to do with the results. In one of the groups a moisture content of 14.42 per cent. in the butter is associated with an "overrun" of 18.7 per cent., and in another group an average of 13.44 per cent. moisture is associated with an "overrun" of 20 per cent. In this case we have an average decrease of about one per cent. moisture in the butter associated with an average increase in the "overrun" of about two per cent. To some extent this is offset by a slight decrease in the percentages of curd and salt in the first group as compared with the second, but this is not sufficient to account for the difference in the "overrun."

During the work done in May, we find groups 2 and 3 with an "overrun" of 20.7 per cent. associated with butters having an average percentage of moisture of 13.2 and 13.76. In these cases the percentages of curd and salt are fairly uniform in both groups.

It is also true that low moisture content in the butter is sometimes associated with a low "overrun." For example, butters having an average of 12.828 per cent. moisture in one of the groups gave an average overrun of 16 per cent., but in this case the percentage of salt was rather low—2.04. The lowest average moisture content in the butters (12.45 per cent.) of any group was associated with the highest overrun (21.4 per cent.).

That it is difficult to tell by the appearance of the butter whether or not it contains an excess of moisture, is indicated by the notes of those in charge of the work. The following are a few comments selected at random from the work: May 19th, —"butter appeared dry" (13.41 per cent. moisture). Same date and butter made from similar cream—"more free moisture and in larger beads" (12.91 per cent. moisture). May 31st,—"butter appeared very dry" (14.21 per cent. moisture).

As a rule, a wash water at a temperature rather warm (58 degrees to 60 degrees F.) tended to give butter with a higher moisture content. This was not always the case. On April 20th, one churning was washed with water at a temperature of 53 degrees F. and the butter contained 14.17 per cent. moisture. A churning out of the same vat of cream and treated as nearly like the previous churning as possible, except that the temperature of the wash water was 58 degrees F., produced butter containing 11.19 per cent. moisture.

It was found that there was a tendency for the butter to be "gritty" and to have too much salt in it when adding salt at the rate of ¾ oz. per pound butter, our usual rate, if the butter were washed by having the rollers in motion. A few tests were made to see the effect of using only ½ oz. of salt per pound of butter when washing in this way. On May 12th, using ½ oz. salt and washing with rollers in motion the butter contained 15. per cent. moisture, 2.8 per cent. salt, and .663 per cent. curd. A churning from the same vat of cream on the same day and made in our regular way, salted ¾ oz. contained 12.55 per cent. moisture, 2.38 per cent. salt, and .529

per cent. curd. May 15th, ½ oz. salt, butter analyzed 15.04 per cent. moisture, 2.41 per cent. salt, and .638 per cent. curd. Butter made in the regular way from same vat of cream and salted ¾ oz. contained 13.93 per cent. moisture, 3.05 per cent. salt, and .701 per cent. curd. On May 17th, four churnings were made in four different ways from the same vat of cream, all salted ½ oz. The butters varied in moisture from 13.4 to 15.14 per cent. and the salt varied from 1.92 to 2.51 per cent. On May 19th, three churnings were made from the same vat of cream and all were salted ½ oz. The moisture in the butters varied from 12.95 to 13.41 per cent.; the salt varied from 1.65 to 2.17 per cent.

The conclusion from these tests would seem to be that the salt retained by the butter varies considerably, and according to chemical analysis, is not a constant factor even when salted at the same rate as nearly as possible. However, so far as taste was concerned the butters made by washing with the rollers in motion appeared to be as salt when salted at the rate of ½ oz. per pound of butter, as those made in the regular way and salted ¾ oz. per pound of butter.

3. So far as the quality of the butter is indicated by the results in scoring there was not much difference from the various methods followed, showing that a butter-maker may vary his methods considerably from what are regarded as standard rules and still be able to make a good quality of butter. However, the tendency was for "mottled" and "gritty" butter when the butter was massed in either the buttermilk or the wash water. The tendency was towards "greasy" butter when it was washed in water at too high a temperature or with the rollers in motion. We should consider there is considerable risk in following any of these plans recommended for increasing the "overrun." A butter-maker should aim to make the *finest quality of butter* rather than to see how large an "overrun" can be obtained.

EXPERIMENTS IN CHEESEMAKING.

General Notes.

The milk used for the experiments in cheesemaking is chiefly furnished by farmers who live in the neighborhood of the College, and differs very little from that usually delivered to cheese factories in the ordinary way. Sometimes the milk is bad-flavored, overripe, gassy, etc., the same as in an ordinary factory. If the milk is too bad, we return it to the patron accompanied by a courteous note of explanation and advice, if brought in by a milk hauler. If the farmer himself delivers the milk, the objectionable qualities are pointed out and a remedy suggested. Usually this results in an improvement next day. During the summer milk is delivered daily. In the spring and fall, delivery is made three and four times a week. It is usually at such times we have most trouble with the flavor of the milk and cheese

Our cheese department is equipped with three cheese vats suitable for handling 300 pounds of milk each. We also have two vats of 800 pounds capacity each and one vat with a capacity of 3,000 pounds milk. All these vats are used for the work, according to whether we have a large or small supply of milk available for cheesemaking and according to the quantity of milk required for the special experiment. The remainder of the equipment is similar to that found in an ordinary small cheese factory.

The method of cheesemaking followed is that regularly taught to our students and commonly practised in the cheeseries of Ontario. We have an ordinary "curing-room," which has a sub-earth duct connected with it. A fairly uniform temperature of 60 to 70°F. can be maintained in this room. We also have a cheese-ripening room, cooled by means of ice, where the temperature is fairly uniform at about 40°F., and two rooms in a mechanical cold storage where the temperature is about 40°F.

In experiments where the yield and quality of cheese are factors to be considered, the milk is first thoroughly mixed in a large vat, then divided into two or more equal parts by weight. So far as possible all the factors affecting yield and quality are made the same, except the special point or points under investigation. We try not to have too many points involved in any one experiment. Simple experiments, as a rule, are more satisfactory than compound ones. By compound, we mean an experiment where a large number of points are under investigation at one time and in one test. As a rule these are confusing.

All cheese are marked with a letter denoting the vat in which the cheese were made, and also with the date of manufacture, as soon as taken from the hoops. The cheese are then weighed and placed in the ripening room. At the end of one month they are again weighed. Six weeks to two months after making the cheese, they are scored by a member of the Dairy staff or some expert brought to the Dairy for the purpose. We also sent cheese to Montreal for scoring during the past season. We are indebted to Messrs. G. H. Barr, Wm. Waddell and Hodgson Bros. & Rowson for assistance in scoring. The scale of points used for judging the cheese consists of flavor 40, closeness 15, even color 15, texture 15, finish 10, total 100. All cheese are given 10 points for "finish," and where this is not shown in the results of the scoring, ten points should be added to the other points given in order to make up the total score. Nearly all the cheese are scored two or three times before being disposed of. Sometimes cheese are kept through the whole season and scored monthly. Where not otherwise stated, the results of the scores represent the average of all the scores given to all the cheese made in that particular experiment.

Details for the manufacture of the cheese in each experiment are not given because it would take up too much space. It is assumed that the persons reading the report are familiar with the processes of cheesemaking, hence do not need the ordinary details explained. Only the main points under each experiment are treated of, otherwise the report would be too lengthy for publication.

In their letter of Nov. 20th, 1906, Messrs. Hodgson Bros. & Rowson, Montreal, make the following remarks regarding the shipment of cheese sent them for scoring on Nov. 8th, from Guelph:

"We enclose you our scoring of the experimental cheese from the College. The flavor, texture, closeness and finish on the whole are excellent. We are very sorry to find that with one exception none of your cheese score full for color. This arises through nearly all the samples you sent us being a little streaky in color. We do not mean mottled, but they show the marks of the curd. This streakiness doubtless will disappear with age, but as there is almost an entire absence of this streakiness in color in the cheese we receive from Peterborough, Picton, and elsewhere, we felt no other alternative than to score them accordingly.

We must, however, congratulate you on the closeness, texture and flavor of the cheese. We consider them, with very few exceptions, exceedingly creditable."

Yours,
HODGSON BROS. & ROWSON, Limited.

Note.—The samples marked 30 for flavor have the following comments in the score card returned, "old milk flavor," "stale and slightly rancid." (See tables of scores given by Hodgson Bros.)

Mr. C. H. Ralph, a cheesemaker of several years' experience, has had direct charge of the experimental cheese work during the past year.

Rennet vs. Pepsin for Coagulating Milk in Cheesemaking.

This is the third year for experiments conducted to ascertain whether or not pepsin is a more valuable agent for coagulating milk for cheesemaking than is rennet, the commoner agent. Pepsin is obtained from the stomachs of animals and is usually sold in scales or powder form. The large packing-houses manufacture the pepsin as a by-product in their business.

To prepare pepsin for use in coagulating milk, a definite weight or quantity is dissolved in a definite volume of water. In the experiments herewith reported upon, three grams of pepsin were dissolved in eight ounces of water and this quantity was added to 300 pounds of milk. One ounce of rennet extract was added to 300 pounds of similar milk for comparison. During the past season nine experiments were made in which were used 5,400 pounds milk testing an average of 3.75 per cent. fat for the lots ripened in cold storage, and 3.67 per cent. fats for the lots ripened in the ordinary room. The average percentage of fat in the whey from both pepsin and rennet lots was .3.

The average percentage of acid in the milk at the time of adding the pepsin and rennet was .21 reckoned as lactic acid. The acidity at the time of "dipping," "milling" and "salting" was practically the same for both, viz.: .2, .5 and .7 per cent. respectively at the three different stages.

During October and November, 1905, three experiments were made in which were used 1,800 pounds milk testing 4.1 per cent fat. The whey tested .27 per cent. fat. These were not reported upon last year.

The yield of green cheese from 1,500 pounds of milk coagulated with pepsin in 1906 was 143.37 pounds. At the end of one month ripening in ice cold storage at 40°F., the weight was 139.7 lbs. The shrinkage was 2.5 per cent.

The same quantity of similar milk coagulated with rennet produced 144 pounds green and 140.23 pounds cheese after ripening one month in an ice cold storage at 40°F. The shrinkage was 2.6 per cent.

From 900 pounds milk coagulated with pepsin in the fall of 1905 the yield was 97.31 and 95.13 respectively for green and ripened cheese. From the same quantity of milk coagulated with rennet the yields were respectively 98.13 and 96 pounds green and ripened cheese. The shrinkages were 2.3 and 2.1 per cent. respectively from the pepsin and rennet lots.

Four lots of each in 1906 were ripened in an ordinary ripening (curing) room at a temperature of 60° to 70°F. The yields of cheese from 1,200 pounds of milk where pepsin was used for coagulating milk was 110.69 and 106.36 pounds green and ripened cheese respectively. From the same quantity of milk using rennet as a coagulating agent the yields were 110.56 and 106.26 of green and ripened cheese. The percentage of shrinkage was 3.9 from the pepsin lots and 3.8 from the lots coagulated with rennet.

The marketable cheese per 1,000 pounds milk for all the experiments in 1906 by using pepsin was 93.1 pounds ripening in an ice cold storage and 88.63 pounds ripening in the ordinary room. By using rennet the marketable cheese per 1,000 lbs. milk was 93.4 pounds from cold storage and 88.6 pounds from an ordinary room.

Quality of the Cheese.

(All cheese were given 10 points for "finish," and this is not included in the total.)

Kind of Cheese	Place of Ripening	Scorer	Average Scores of the Cheese				Total 100
			Flavor 40	Closeness 15	Color 15	Texture 15	
Pepsin.......	Ice Coldstorage at 40° F.	Dairy...........	36.85	14.07	14.4	18.5	93.82
Rennet	" "	"	37.	14.21	14.5	18.8	94.51
Pepsin.......	Ordi'y room 60° to 70° F.	"	36.	13.90	14.3	17.	91.20
Rennet	" "	"	36.1	14.09	14.3	18.	92.49
Pepsin.......	Ice Storage	Barr & Waddell.	37.5	14.	14.5	17.5	93.50
Rennet	" "	" " ..	38.	14.	14.5	17.5	94.
Cheese made May 25, 1906		Cheese scored Nov. 6, 1906					
Pepsin.......	" "	Barr & Waddell.	37.5	14.	14.5	17.	93.50
Rennet	" "	" " ..	38.	14.	14.5	17.5	94.
Cheese made May 25, 1906		Cheese scored Nov. 15, 1906					
Pepsin.......	" "	Hodgson Bros...	40.	15.	13.	20.	98.
Rennet	" "	" " ..	40.	15.	13.	20.	98.
Cheese made Oct. & Nov., 1905							
Pepsin.......	" "	Waddell	37.17	13.8	14.17	17.	92.1
Rennet	" "	"	37.50	13.8	14.50	17.7	93.5

Conclusions.

1. We cannot do better than quote from last year's report in which we said: "The yield of marketable cheese was slightly greater from using rennet as compared with pepsin for coagulating milk." The yields of marketable cheese per 1,000 lbs. milk were 93.1 lbs. from pepsin and 93.4 lbs. from rennet ripening in ice storage. Ripening in the ordinary room the yields were practically the same, 88.6 lbs. cheese per 1,000 lbs. milk. The percentages of shrinkages were respectively 2.5 and 2.6 using pepsin and rennet, and ripening in cold storage. Ripening in the ordinary room the shrinkages were 3.9 and 3.8 per cent. from the pepsin and rennet lots respectively.

2. The quality of the cheese was very similar from both the pepsin and rennet as shown in the table of scorings. Incidentally there is shown in the table the variation in the scores given to two lots of cheese by different judges. The lots made May 25th, 1906, were scored 93.5 and 94 points out of a possible 100 on November 6th, by Messrs. Barr and Waddell. These same cheese were shipped to Montreal that same week and the report from Messrs. Hodgson Bros. Rowson showed a scoring of 98 points each.

3. As a result of three years' work comparing rennet and pepsin as agents for coagulating milk we are not prepared to recommend pepsin in preference to rennet, chiefly because the pepsin is more difficult to prepare for addition to the milk, and there appears to be no advantage in yield or quality of cheese as a result of using the pepsin.

EXTRA RENNET FOR CHEESE RIPENED IN COLD STORAGE.

This experiment has now been conducted for four years and it is probably sufficient for the present. During the season, six lots of cheese were made by using 6 2-3 ounces of rennet per 1,000 lbs. milk and six lots were made from similar milk using rennet at the rate of 3 1-3 ounces per 1,000 lbs. milk.

The milk tested an average of 3.66 per cent. fat. The whey from both the lots of curd tested an average of .22 per cent. fat. The average acidity of the milk at the time of renneting or "setting the vat" was .206 per cent., reckoned as lactic acid, using phenol-thalein as an indicator.

The yield of cheese per 1,000 lbs. milk where rennet at the rate of 6 2-3 ounces of rennet per 1,000 lbs. milk were used, was 98.78 lbs. of green cheese and 95.45 lbs. cheese weighed at the end of one month. The shrinkage in one month ripened in an ice cold-storage at a temperature of about 40°F. was 3.3 per cent.

The yield of cheese per 1,000 lbs milk by using rennet at the rate of 3 1-3 ounces per 1,000 lbs. milk was 98.11 lbs. green cheese and 94.96 lbs. weighed at the end of one month. The shrinkage in one month was 3.2 per cent.

The quality of the cheese is indicated in the table of average scores.

Amount of Rennet per 1000 lbs. Milk	Method of Ripening	Flavor 40	Closeness 15	Even Co or 15	Texture 20	Finish 10	Total 100
$6\frac{2}{3}$ oz.	Ice Cold Storage 40° F.	37.2	13.60	14.70	18.4	10	93.90
$3\frac{1}{3}$ oz.	" " "	37.5	14.07	14.86	18.7	10	95.13

Conclusions.

The results agree with those obtained in previous years, viz.: that the yield of cheese was slightly greater by using double the usual quantity of rennet. There was little difference in shrinkage or quality of cheese, what there was being in favor of the normal amount of rennet, viz.: about three ounces of rennet per 1,000 lbs. milk. For more rapid ripening in cold storage extra rennet may be used. Similar results were got in experiments made during November, 1905, and which were not reported upon last year, as the cheese were not ready to score at the the time our annual report was written.

DIFFERENT TEMPERATURES FOR COOKING CURDS.

This is the second year for systematic conducting of experiments to determine the effects of "cooking" curds to a higher temperature than that usually followed, viz., 98° to 100°F. Two experiments were made near the end of the season 1905 which were not reported upon last year. This year eight tests were made. Altogether there were used for these tests 1,200 pounds testing an average of 4.15 per cent. fat in 1905, and 7,170 lbs. milk testing an average of 3.77 per cent. fat in 1906. The average percentage of fat in the whey was .25 and .33 for the two seasons respectively. The lots made in 1905 were ripened in the ice storage. There was practically no difference in the yield of marketable cheese whether cooked to 106°F. or 98°F. in the fall of 1905. The average total score of the cheese was exactly the same for both lots as given by Mr. Waddell, viz., 90.7 points. The lots "cooked" to 106°F., had about .1 per cent. less acid at "milling" and "salting" as compared with the lots cooked to 99°F.

One-half the curds in 1906 were cooked to an average temperature of 105.4°F., and the other half to 99.6°. The percentages of acid at the time of "setting," "milling" and "salting" were respectivly .195, .50 and .651

for the curds cooked above 100°. The normal curds at these stages contained an average of .197, .577 and .761 percentages of acid. All the cheese were ripened in the ordinary ripening (curing) room at a a temperature of 60° to 70°F. The cheese were weighed when taken from the hoops, and again in one month. Scoring was done monthly.

Yield and Quality of Cheese from Cooking Curds above 100°F. vs. under 100°F.

Average Temp. for "cooking" the curds	Lbs. Cheese per 1000 lbs. milk.		Scorer	Flavor 40	Average Score for			Total 100
	Green.	Ripened.			Closeness 15	Color 15	Texture 20	
105.4° F.	103.97	100.95	Dairy	35.60	13.20	14.	16.80	89.60
99.6° F.	104.72	101.62	"	35.80	13.20	14.	17.	90.
105.4° F.	....	....	Barr & Waddell..	37.12	13.87	14.	17.37	92.36
99.6° F.	....	....	"	36.87	14.12	14.	17.	91.99
105.4° F.	....	....	Av. of all Scores....	36.27	13.50	14.	17.06	90.83
99.6° F.	....	....	"	36.27	13.61	14.	17.	90.88

Conclusions.

These are very smilar to those of last year, viz., that cooking to a temperature above 100°F. tends to check the development of acid, produces less cheese per 1,000 pounds of milk, and does not ordinarily improve the quality of the cheese. A temperature between 98° and 100°F. seems to be a very favorable one for "cooking curds" and only in exceptional cases, such as handling over-ripe milk," is it advisable to "cook" much above 100°F. In the fall of the year, when the milk is usually richer, higher temperatures for cooking curds may be used, than is advisable earlier in the season.

MOISTURE IN CURD AND CHEESE.

We have pursued the policy in reference to this question which we follow in all important lines of investigation. This has been referred to in previous reports, viz., that we make a comparatively limited number of distinct experiments in one year and follow these for three to five years. We believe that results and conclusions so obtained are more valuable than those got by making a larger number of tests in a single experiment in one year, then dropping the subject. Owing to the variation in season and quality of milk from year to year it is only after averaging results from several seasons that we can arrive at correct conclusions.

Results of the fourth year tests on the amount of moisture in curds at the time of "dipping" and also in the green cheese, and the relation of this to the yield and quality of cheese follow. The method for determining the moisture is outlined in another part of my report. The remainder of the work was done along lines similar to the ordinary processes followed in Canadian Cheddar Cheesemaking, except that the curds containing an excessive amount of moisture were stirred very little at the time of "dipping" or removal of the whey.

Fourteen experiments were made during the season for which were used 11,550 pounds milk testing an average of 3.68 per cent. fat. The percentage of fat in the whey averaged .2. From 600 to 1,400 pounds milk were thoroughly mixed in a vat and afterwards divided into two equal quantities. Rennet at the rate of 3 1-3 ounces per 1,000 lbs. milk was added and the two lots of milk were made into cheese, following exactly the same plan with each as nearly as possible, except for the variation at the time of "dipping" already noted. Part of the cheese from both lots was ripened in an ordinary ripening room for one week, then they were moved to an ice cold storage. The remainder of the cheese were ripened for the full period in the ice storage at about 40°F. The cheese were weighed when taken from the press and again when one month old. The former are referred to as "green" cheese and the latter as "ripened" cheese.

The cheese were scored for the first time when six weeks to two months old and once a month thereafter until disposed of. Some of the cheese were kept through the whole season. The scores represent the averages as given by the different persons who judged the cheese.

The yield of ripened cheese in cold storage per 1,000 lbs. milk from curds containing an excessive amount of moisture was 99.9 pounds; normal curds 99.5 pounds; shrinkage 2.8 and 2.6 per cent. respectively. The lots held in the ordinary room for a week before moving to cold storage yielded 97.2 pounds marketable cheese per 1,000 lbs. milk from curds testing about 52 1-2 per cent. moisture at dipping, while the normal curds yielded 96.4 pounds per 1,000 lbs. milk. The shrinkage was 3.3 and 3.0 per cent. respectively.

Table Showing Moisture and Acidity of Curds.

	"A" Cheese containing excessive moisture	"B" Cheese containing normal moisture
	Average %	Average %
Moisture in curds at dipping..............	52.493	47.811
" " green cheese..................	35.645	35.175
Percentage acid at dipping	.198	.198
" " at milling................	.632	.542
" " at salting.................	.833	.809

Table Showing the Quality of the Cheese.

Kind of Cheese.	Method of Ripening.	Scorer.	Average Scores for:				Total.
			Flavor. 40	Closeness. 15	Color. 15	Texture. 20	
Excessive Moisture..	1 week ordinary room, then ice storage.	Dairy.........	36.5	13.8	14.7	18.2	93.2
Normal.......	" "	"	36.5	14.1	15.	18.7	94.3
Ex. moisture..	" "	Barr&Waddell	35.8	13.3	14.	16.5	89.6
Normal.......	" "	" "	36.	13.3	14.	16.5	89.8
Ex. moisture..	Ice storage......	Dairy.........	37.75	14.	15.	18.5	95.25
Normal.......	" "	"	37.75	14.	15.	18.5	95.25
Ex. moisture..	" "	Barr&Waddell	36.8	14.3	14.2	17.	92.3
Normal.......	" "	" "	37.10	13.6	14.1	17.	91.9
Cheese made Aug. 8, 1906.							
Ex. moisture..	" "	Barr&Waddell	38.	14.5	14.5	17.5	94.5
		Hodgson Bros.	40.	15.	14.	20.	99.
Normal.......	" "	Barr&Waddell	37.5	13.5	14.	17.	92.
		Hodgson Bros.	40.	15.	14.	18.	97.

Conclusions.

1. The curds containing an excessive amount of moisture averaged 52.493 per cent. at the time of "dipping," while the normal curds averaged 47.811. The difference in the moisture of the green cheese was less than one half of one per cent. The acidity developed somewhat faster on the moist curds, as shown by the average percentages of acid at the stages of "milling" and "salting."

2. The cheese yield, with the higher percentages of moisture in the curds at dipping, was about one half pound greater per 1,000 pounds milk, which corresponds closely with the work done last year.

3. There did not appear to be very much difference in the quality of the two lots of cheese, although Messrs. Barr and Waddell and Hodgson Bros. scored the cheese made from the moist curd somewhat higher.

We consider this a very important question for practical cheesemakers to consider. The markets are demanding "fatter" cheese, which really means cheese with more moisture in them. As the moisture in cheese is the *natural* moisture of milk, there is not the same objection to it as in butter, because in the butter the moisture or water is extraneous.

ACIDITY OF CURD AT TIME OF SALTING.

These are a continuation of the experiments made last year During 1906, 34 experiments were made. For the tests there were used 34,451 pounds milk, testing an average of 3.54 per cent. fat. The whey at the time of dipping tested an average of .218 per cent. fat. The milk from our regular delivery was run into a vat and the curd was handled in the one vat or curd sink until the first curd had sufficient acid to salt. If two cheese only (A and B) were made, the curd was equally divided by weight at this time and the second was salted about one hour after the first, at which time the second curd contained about .1 per cent. more acid than did the first one salted and nearly 4 1-2 times as much acid as the milk contained at the time of "setting."

Table Showing Results of Salting Curds at Various Stages of Acidity.

Cheese	Average % acid at			Av. time from dipping to salting	Av. lbs. cured cheese per 1000 lbs. milk	Av. per cent. shrinkage in one month.	Temp. and moisture of ripening room	Scorer	Average Score for				
	Dipping	Milling	Salting	H. M.					Flavor 40	Closeness 15	Color 15	Texture 20	Total 100
A.	.210	.643	.815	2 53	93.9	2.74	40.8°F. 81.8°%	Dairy...	37.10	14.10	14.63	17.93	93.76
B.			.915	3 52	93.5	2.68	......	"	36.83	14.12	14.56	17.98	93.46
A.	.207	.577	.740	2 35	92.3	3.12	......	"	36.67	13.33	14.	18.	92.
B.	.....	.....	.842	3 20	92.	3.06	......	"	37.	14.	14.33	18.	93.33
C.	.....	.....	.....	4 14	90.9	2.86	......	"	37.	14.	14.	17.67	92.67
D.	.....	.....	.....	5 05	90.9	2.75	......		37.	14.	14.5	17.5	93.
								Barr and Waddell					
A.	.....	.....	.....	2 35	......	......	......	"	38.	14.25	14.25	18.5	95.
B.	.....	.....	.....	3 20	......	......	......	"	38.25	14.5	14.25	18.5	95.5
C.	.....	.....	.....	4 14	......	......	......	"	37.75	14.25	14.25	18.	94.25
D.	.....	.....	.....	5 05	......	......	......		37.50	14.	14.25	18.	93.75

In a number of experiments four cheese (A, B, C, and D) were made from the same vat of milk. As it was found difficult to secure correct tests of the acidity for the third and fourth curds at the time of salting, the *time* from dipping to salting of these curds is given. On the average, each of the three last curds were salted about one hour after the preceding one. All the cheese were ripened in mechanical cold storage at an average temperature of 40.8°F. and with 81.8 per cent. moisture in the air of the ripening room.

Part of the cheese were judged by a member of the Dairy Staff and part by Messrs. Barr & Waddell. Two lots, eight cheese, scored by Barr. & Waddell on November 6th, were shipped to Montreal on November 8th, where they were again scored by Hodgson Bros.

The first table shows the main points regarding the making of the cheese and the average of the scores given by the Dairy and by Messrs. Barr & Waddell for the main part of the experiments.

The second table shows the relative scores given by two sets of judges on the same cheese within a few days of each other. These show quite a wide difference in the values or scores placed upon the same cheese by different men.

By averaging the totals given by the two sets of judges we get the numbers 93.5, 93.7, 94.8 and 95.6 for the A, B, C and D lots, showing a tendency for a higher score on the two lots where the cheese were kept from one to two hours longer than usual before salting, but the yield of cheese was from one-half to over one pound less, per 1,000 pounds milk, by maturing to these later stages.

Table Showing Scores of Eight Lots of Cheese Salted at Different Stages of Acidity, and Scored by Messrs. Barr, Waddell, and Hodgson Bros.

Kind and Date of Cheese.	Scorer.	Scores given for:					Total.
		Flavor.	Closeness.	Even color	Texture.	Finish.	
		40	15	15	20	10	100
July 30, "A"	Hodgson Bros...	30	15	13	20	10	88
	Barr & Waddell.	39	14.5	14.5	18.5	10	96.5
"B" salted 1 hour later than "A".	Hodgson Bros...	30	13	13	20	10	86
	Barr & Waddell.	38.5	15	14.5	19	10	97
"C" salted 1 hour after "B"	Hodgson Bros...	30	15	13	20	10	88
	Barr & Waddell.	37.5	14.5	14.5	17.5	10	94
"D" salted 1 hour after "C"	Hodgson Bros...	38	15	15	20	10	98
	Barr & Waddell.	37	13.5	14.5	18	10	93
Sept. 10, "A"	Hodgson Bros...	38	15	13	20	10	96
	Barr & Waddell.	37	14	14	18.5	10	93.5
"B" salted 1 hour after "A"......	Hodgson Bros...	40	15	13	20	10	98
	Barr & Waddell.	38	14	14	18	10	94
"C" salted 1 hour after "B"......	Hodgson Bros...	38	15	12	18	10	93
	Barr & Waddell.	38	14	14	18.5	10	94.5
"D" salted 1 hour after "C"......	Hodgson Bros...	40	15	12	20	10	97
	Barr & Waddell.	38	14.5	14	18	10	94.5

Conclusions.

1. In one series of experiments the yield of marketable cheese for 1,000 pounds of milk was lessened .4 pound by developing .1 per cent. more acid before salting as compared with curd salted in about three hours after dipping. In the second series, the yield of marketable cheese per 1,000 pounds milk was reduced 1.1 pounds by holding for about two hours after the usual time of salting. The percentage of shrinkage was, however, somewhat greater on the cheese salted at the usual time or before, viz., about three hours after dipping.

2. The results in quality of cheese are somewhat conflicting, but the tendency was for the judges to give higher scores to the cheese made from curd held for more than three hours after dipping. Whether or not this extra quality will pay for the extra loss of time in making and for the extra loss of cheesemaking material, chiefly fat, is a question which will require further work before a definite answer can be given, even if it can be given at all.

Effects of Different Temperatures on Cheese Ripening.

As intimated last year, we consider that sufficient work has been done at present on the question of the effects of various temperatures in ripening cheese. The results of several years' work may be summarized by saying, that so far as our experiments are concerned, the results indicate that the lower the practicable temperature for ripening the cheese the better is the quality of the cheese, and that about 40 degrees F. has given the best all-round results as compared with higher temperatures for ripening cheese.

However, we have been told that in the fall of the year it is very unwise to place cheese in a cold room as the cheese are spoiled. To test this point, we made on September 26th, 1906, 1,271 pounds, milk testing 4.0 per cent. fat, into three cheese weighing about 42½ pounds each when green. The whey tested .25 per cent. fat. The percentages of acidity at "dipping," "milling," and "salting" were respectively .2, .58 and .85.

After taking the cheese from the hoops they were weighed and marked A, B, and C. The "A" cheese was placed directly from the hoops into an ice cold storage where the average temperature was 44.3 degrees F. and where the air contained an average of 87 per cent. moisture. B and C were placed in an ordinary curing room at a temperature of about 60 degrees F. and having 83 per cent. moisture in the air. At the end of one week the B cheese was moved from the ordinary room to the ice storage, while C remained in the ordinary room. All three cheese were scored on November 6th, by Messrs. Barr & Waddell and about one week later by Messrs. Hodgson Bros. and Rowson in Montreal.

The table shows the shrinkage and quality of the three cheese:

Kind of Cheese.	Per cent. shrinkage one month.	Scorer.	Scores as given by two sets of judges.				Total.
			Flavor. 40	Closeness. 15	Even color. 15	Texture. 20	100
A. ripened in cold storage.	2.19	Barr & Waddell.	38	13.5	14	17.5	93
		Hodgson Bros. & Rowson	40	15	13	20	98
B. ordinary room one week then cold storage.	2.32	Barr & Waddell.	38	14	14	17	93
		Hodgson Bros...	40	15	12	18	95
C. Ordinary room @ 60°F.	2.96	Barr & Waddell.	37.5	14	14	17	92.5
		Hodgson Bros...	38	15	10	18	91

Conclusions.

1. The lower the temperature for ripening, the less the shrinkage and the better the quality of the cheese. Messrs. Barr & Waddell scored the A and B lots practically the same while Hodgson Bros. scored the cheese put directly from the press into ice storage three points higher. We have here also an illustration that "doctors differ" in their judgment.

2. From this and various other tests we have made, we have failed to see any harm coming to cheese placed directly from the press into a room where the temperature was about 40 degrees F. However, if we found a buyer objecting to this plan we should try to meet his wishes, so far as possible, as it usually pays to cater to the wishes of customers.

RIPENING CHEESE ON SHELVES VS. BOXING DIRECTLY FROM THE PRESS AND BOXING AT THE END OF ONE WEEK ON SHELVES.

These experiments have been carried on four years. In our last report we said, "The practical bearing of these experiments lies in its application to a system of ripening (curing) cheese in cold storage at the factory or at some central point, during which the cheese would not be removed from the boxes. If this plan of ripening cheese in boxes in cold storage be practicable it means a great saving of labor in the handling of the cheese and also a saving of space for ripening and storing the cheese."

Method of Ripening.	Scorer.	Average Score for:					Total. 100	Per cent. shrinkage in one month.
		Flavor. 40	Closeness. 15	Color. 15	Texture. 20	Finish. 10		
Ice Storage @ 40°F.								
Boxed directly from press	Dairy	37	14.14	14.85	18.40	10	94.39	1.48
Boxed after being on shelf one week	"	36.8	14.	14.70	18.30	10	93.80	1.80
On shelf	"	37.	14.16	14.75	18.17	10	94.08	2.40
Mechanical Storage @ 40°F.								
Boxed directly from press	"	36.55	14.18	14.80	18.11	10	93.64	1.90
Boxed after being on shelf one week	"	36.85	14.21	14.85	18.43	10	94.34	2.20
On shelf	"	36.67	14.34	14.92	18.20	10	94.13	2.60
Ice Storage @ 40°F.								
Boxed directly from press	Barr & Waddell.	37.50	14.25	14.	17.	10	92.75	......
Boxed after being on shelf one week	" "	37.50	14.25	14.	17.	10	92.75	......
On shelf	" "	38.	14.50	14.50	17.	10	94.	......
Cheese made July 16th	" "	......	......	......	......	......	......	......
Boxed directly.	Barr & Waddell.	37.	14.	14.	16.50	10	91.50	......
	Hodgson Bros.	38.	15.	12.	20.	10	95.	......
Boxed in one week	Hodgson Bros.	30.	15.	12.	18.	10	85.	......
	Barr & Waddell.	37.	14.50	14.	16.50	10	92.	......
On shelf	Barr & Waddell.	38.	14.50	14.50	17.	10	94.	......
	Hodgson Bros.	40.	15.	12.	20.	10	97.	......

During the past year, thirteen experiments were made on this question, in which were used 21,197 lbs. milk testing an average of 3.61 per cent. fat. The average percentage of fat in the whey was .22. The experiments were made by using from 1,400 to 2,100 lbs. milk for each experiment from which two or three cheese weighing about 70 lbs. each were made in the usual way. When 2,100 lbs. milk was available one of the three cheese, when taken from the press, was placed at once in a clean dry box in either ice or mechanical cold storage at about 40 degrees F. The other two were placed on shelves in cold storage. At the end of one week, one of these was placed in a box and allowed to remain in the cold storage until ripened. When only two cheese were made in one day, one cheese was boxed directly from the press and the other was ripened on the shelf for a week, then it was boxed. At the next time of making the experiment, one cheese was boxed direct from the press and the other was ripened on the shelf in the cold storage. About half the cheese were ripened in an ice cold storage and half in mechanical. Both storages were kept as nearly as possible at a uniform temperature of about 40 degrees F.

The cheese were scored the first time, when six weeks to two months old and afterwards about once a month throughout the season.

The table shows the average of all scores and also the percentage of shrinkage during one month.

The results are similar to those obtained in former years and we cannot do better than quote from last year's report: "These results . . . indicate that it is quite practicable to put cheese from the hoops into a clean, dry box and place them in cold storage at 40 degrees F." "The chief objection to the plan is the strong development of mould on the cheese and in the box." There is a saving of about one per cent. in shrinkage by boxing directly from the press as compared with ripening on a shelf during a period of one month. The saving in shrinkage is less than one-half of one per cent. if the cheese be left on a shelf for one week before being placed in boxes.

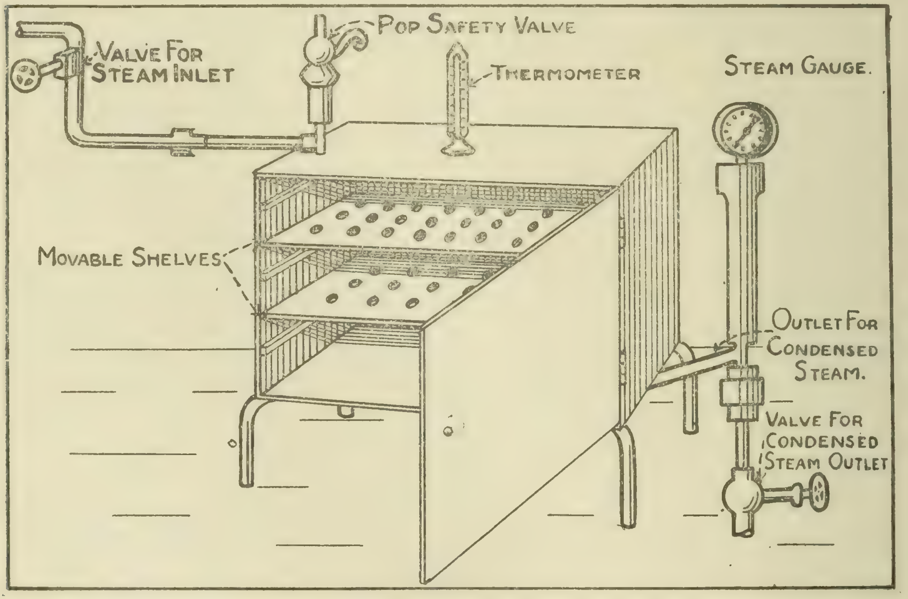
The three cheese made July 16th were scored by Messrs. Barr & Waddll on November 6th, and on November 8th these cheese were sent to Montreal, where they were scored by Hodgson Bros. There appears to be a marked discrepancy between the scores given to these cheese by the two sets of judges. This is especially so for the cheese placed on the shelf for a week, then moved into a box. Messrs. Barr & Waddell scored this cheese 92 points, while Hodgson Bros. gave it 85. Both gave the highest score (97 and 94) to the cheese ripened on the shelf in cold storage.

Two cheese were made June 13th, 1906, in a similar experiment to that of July 16th, except that the cheese on the shelf for a week was left out. These were also sent to Montreal at the same time as the lots of July 16th. Hodgson Bros. scored the cheese ripened in the box in cold storage 89 points and the one ripened on the shelf in cold storage 97. Messrs. Barr & Waddell scored the cheese ripened in the box 94 points and the one on the shelf 93½ points. Hodgson Bros. made a difference of 5 points in flavor and 3 in texture, in favor of the cheese ripened on the shelf. Barr & Waddell scored the two cheese exactly the same in every point except "closeness," for which they gave the cheese ripened in the box one-half point higher. Both these cheese were made from the same curd and treated exactly alike in every way, so far as possible, until they were placed in the ripening-room.

MISCELLANEOUS EXPERIMENTS AND WORK.

A Method of Determining Moisture in Butter, Curd and Cheese, which may be applied to Factory Work in Creameries and Cheeseries.

It would be of great advantage to butter and cheese makers if they had some rapid and approximately accurate method of determining the moisture in butter and cheese at small expense. Various devices have been suggested and tried, but none, so far as we know, have proven satisfactory to the average man. In the following notes we hope to make some suggestions of value along these lines. There is nothing very new or original in some parts, but the method of approximately estimating the moisture in a curd at the time of "dipping," or drawing the whey in Cheddar cheese-making, we believe to be entirely new, and trust that it may prove of some value to men in factories. We are not altogether satisfied with the method, but it seems to be a step in the direction of enabling the cheese-makers in the factory to secure more uniform degrees of moisture in the curd at the time of "dipping" and consequently more uniform cheese. It is not claimed to be scientifically accurate, but is along lines similar to those of the rennet test and acidimeter, which have proved to be helpful guides to the cheese-makers.



Portable Drying Oven.

Before dealing with this part of the work we shall first consider a few modifications of the methods ordinarily followed by chemists in determining the moisture content of butter, curd and cheese, which will enable the man in the factory to make use of such tests. We are indebted to the Chemical department of the College for suggestions.

Two years ago we had a steam oven connected with an ordinary steam pipe in our creamery for the purpose of drying samples. This oven is constructed on the same plan as the ordinary water bath oven used by chemists.

It was made by a local tinsmith of galvanized iron. There is an inch space for steam, between the outer and inner parts on all sides of the oven, except the front, where the door is located. It has ¼-inch steam pipe connections, for the inlet of steam on the top of the oven, and for the outlet of condensed steam near the bottom. Two regulating valves, a "pop" safety valve, a steam pressure gauge, a thermometer and two shelves in the oven for holding samples complete the outfit. The total cost was about five dollars, exclusive of safety valve and pressure gauge. The oven is made to withstand a steam pressure of about ten pounds. At first we did not use a safety valve and consequently too much steam was turned on by careless persons, which burst the oven on one or two occasions. A safety valve of the "pop" style is not expensive and is a measure of safety. After the steam pressure is regulated on the oven in the morning, it requires practically no attention during the whole day.

The dishes used by us for drying the samples are ordinary "pattypans" made of tin. These pans are about half an inch deep and two and one-half inches in diameter. The oven, which is 6 x 8 inches inside, will hold eighteen of these dishes on the two shelves and bottom, which latter acts as a shelf for holding samples.

The method followed for determining the moisture in butter is briefly as follows: about four ounces of butter is placed in a tightly stoppered bottle, care being taken to have this sample as representative as possible. The sample bottle is then set in a dish of hot water at about 140 degrees F. and the butter allowed to melt. As soon as melted the sample is thoroughly shaken and about 6 cc. of the melted butter is measured into two of the small dishes which had been previously weighed. About 3 cc. of the melted butter having been placed in each dish, they are quickly weighed, and then transferred to the steam oven for five or six hours. At the end of this time, samples are weighed. They are replaced in the oven and allowed to remain for 1 to 2 hours longer. If they are now the same weight as at the first weighing, or practically so, they are considered to be "moisture-free." We made several comparisons of this plan as compared with shaking the melted sample under cold water until the fat was solidified before sampling, and invariably found the duplicates to agree more closely by transferring the melted sample directly to the dish, and the labor involved by this plan is very much less.

In order to make comparison between the results obtained by following the plan as outlined, and the results as got in the Chemical Laboratory of the College, we took nine samples in June and July, the average moisture content of which was 13.587. The average of the moisture determinations from these nine samples as reported from the Chemical Laboratory was 13.715. The average difference was .128 per cent., which is well within the "limits of error."

The actual time required to make a moisture determination as outlined is not very much and is quite within the range of a butter-maker who has had some training in the use of a balance. For keeping records we use a small note book ruled into columns having headings as follows:

Date.	No. of dish.	Weight of dish.	Weight of dish and butter.	Weight of butter.	Time placed in oven.	1st Wt.	2nd Wt.	p. c. Moisture.	Remarks.

It is considered by some, if a sample of butter or cheese be left in the drying oven after the moisture has been evaporated, that the product increases in weight by oxidization. Several samples of butter and cheese were weighed for the second time about 4 p.m. They were placed in the oven again and allowed to remain until about 9 a.m. next day. The following figures show the results of these tests:

for the second time about 4 p.m. They were placed in the oven again and

Product.	*Weight, 4 p.m.*	*Weight, 9 a.m.* ***next day.***
Green cheese	22.370 grams.	22.365 grams.
" "	30.690 "	30.700 "
" "	18.725 "	18.715 "
" "	18.655 "	18.655 "
Butter	28.450 "	28.455 "
"	20.150 "	20.150 "
"	28,725 "	28.735 "
"	20.050 "	20.050 "
"	28.870 "	28.870 "
"	19.990 "	19.990 "
"	21.610 "	21.610 "
"	32.780 "	32.770 "

It will be seen by the foregoing that there is not much difference between the weights at 4 p.m. as compared with the weights at 9 a.m. the following morning. The practical application of this knowledge lies in the fact that if a factoryman were unable to make the second weighing the same day as the first weighing is made, no particular harm would result from leaving the samples in the drying-oven over night.

The method followed in sampling curd is somewhat as follows: After the whey has been run off and the curd has been placed in a curd sink or on racks in the vat and has been stirred until the cheese-maker thinks he has about the right degree of moisture left in the curd, samples are taken from three or four different parts of the curd and placed in a tightly stoppered bottle. A bottle holding about four ounces with a wide mouth and having a screw top, is very convenient for taking the samples. The small dishes are now weighed and the sample is thoroughly mixed as quickly as possible in the bottle with a spatula. From three to four grams of the curd are now quickly transferred to the small dish, weighed and placed in the oven. For accurate work, two samples should be taken and the results averaged. The remainder of the process is the same as for butter. It is very important to get first a representative sample from the large curd and also important to have the small sample which is placed in the dishes, representative. This latter can be got by mixing well in the sample bottle, and taking a small sample out quickly before the moisture or whey separates from the curd. It is also well to have the sample bottle not over half full in order to leave room for thorough mixing.

The samples of green cheese are usually taken by us before turning the cheese in the hoops on the following day after being made.

One sample is taken with a tryer from each cheese and then the cheese are placed in the press again for several hours. This closes up the hole made by the tryer and the cheese are not disfigured so much. The plug is drawn at a point about half way between the centre and outside of the cheese. Two or three plugs from a cheese would be more likely to be representative, but these disfigure the cheese more.

The plug is then transferred to a sample bottle, like that used for curd, and after cutting the whole plug into pieces as fine as possible, from two to four grams are transferred to the drying dishes, weighed and placed in the steam oven. The remainder of the work is similar to that described for butter. An example of the method followed in calculating the percentage of moisture in a given sample will make it clear to those not familiar with such work.

Weight of dish	19.91 grams.
" " and cheese	23.03 "
" cheese in dish	3.12 "

Weight of cheese and dish after drying 6 to 8 hours = 21.98 grams. 23.03 — 21.98 = 1.05 grams lost in weight during drying. The loss on 3.12 grams = 1.05 grams . ˙ . the per centage lost = 1.05 × 100 ÷ 3.12 = 33.653 The percentage of moisture in the cheese is, therefore, 33.653. (This is assuming that nothing but moisture is lost from the cheese during the drying process. We are aware, some authorities consider that other volatile products may be lost during the drying of samples of butter and cheese, but as this has not been investigated, so far as we know, we shall assume that moisture only is lost during the process of drying in a steam oven. In any case, the volatile products lost, other than water, are likely to be small and will not seriously affect the results.)

We do not suppose that factorymen will have the time or inclination to test the moisture in all their dairy products, but we do think that a factory equipped with the apparatus outlined in the foregoing could test their dairy products from time to time at small expense and with material advantage to the factory.

A SHORT TEST FOR DETERMINING THE MOISTURE IN CURD AT DIPPING.

Uniform moisture in curds at the time of "dipping" or removal of the whey would be a great advantage to cheese-makers, and would tend, as we have said, to a more uniform quality of cheese. At the time when the curds are ready to "dip," is usually one of the busiest parts of the day, for a cheese-maker. As soon as the curd has sufficient acid for dipping, the bulk of the whey should be removed as quickly as possible. Any delay means an inferior quality of cheese. In our report for last year, p. 118, we say that one of the objects of the experiments made *re* "moisture in curd and cheese" was, "to find if possible a rapid method of approximately determining the moisture in curds at dipping." We further mentioned that we thought we had discovered such a method, but preferred doing further work on it before publishing the results. During the past season about one hundred lots of curd were tested with this short method and the results were compared with the actual determination of the moisture in the drying-oven as previously outlined.

This short test is based on the assumption that the specific gravity of a given volume of curd will vary approximately according to the moisture contained in that curd. Other factors also enter into the problem, such as the proportion of fat to casein, etc., but we have found that fairly uniform results are got by following the plan as outlined below:

For convenience, we used the acid measure in connection with the Babcock test, which is graduated to hold 17.5 cc. After the curd was stirred the measure was packed full of the curd to the 17.5 cc. mark, using a round stick for the purpose, and selecting small portions of the curd from various parts of the mass. The measure having been previously weighed, all that was necessary was to weigh the curd and measure, subtract the weight of the measure from the total, and the result was the weight of curd. (By having the balance regulated with a counterpoise equal to the weight of the measure, the net weight of the curd would be ascertained more quickly. We also found there was some danger of breaking the glass measure, so got a tin measure made of same shape and size. This is not quite so convenient to fill and empty, but is not easily broken.)

Nearly fifty comparative tests were made from May to October, 1906, by stirring a curd very little at "dipping," then sampling, and afterwards stirring either the same curd or another curd from similar milk to a normal condition as indicated by the judgment of the cheese-maker. We have divided these results into four series, one being the average of results got in 1905, and three, the averages got in 1906. These latter three represent approximately the three parts of the cheese season, viz., spring, summer, and fall.

The following table shows the average of the results got in each series and also the average for the two years:

Date.	Curds with excessive amount of moisture at dipping.			Curds with normal amount of moisture at dipping.			Average % decrease in moisture of curds at dipping for each decrease of .1 gram in weight of 17.5cc curd.
	Average % moisture at dipping.	Average % moisture in green cheese.	Weight of 17.5cc curd. Grams	Average % moisture at dipping.	Average % moisture in green cheese.	Weight of 17.5cc curd. Grams	
1905............	52.234	35.983	16.56	46.206	34.777	15.71	.70
May and June, 1906.........	49.764	34.821	17.93	46.856	34.262	17.47	.63
July and August, 1906....	51.133	35.023	17.66	46.499	34.711	16.80	.58
September and October, 1906	53.246	35.564	17.78	48.378	35.755	16.91	.56
Averages..	51.594	35.347	17.48	46.984	34.876	16.72	.617

Conclusions.

1. Cheese and butter-makers would find it convenient and valuable to know approximately the percentage of moisture contained in the products which they manufacture. With a steam drying oven, balance, and other small apparatus mentioned in the foregoing, we believe it quite practicable for average men, who have had a little training in the use of a balance, to ascertain the moisture content of the dairy goods which they are manufacturing.

2. For obtaining comparatively uniform percentages of moisture in the curds at dipping, we suggest to cheese-makers that they try the specific gravity or weight plan. The results of our work seem to indicate that if a given volume of curd weighs slightly less than 1 gram for each cubic centimeter of curd packed closely into a cylindrical vessel, it will contain about the proper degree of moisture at the time of dipping. The results further show that for each increase or decrease of .1 of gram in weight, which 17.5 cc. of curd may vary, the moisture increases or decreases by about .6 per cent. This decrease in weight of a given volume of curd may be explained by assuming that the same volume of curd is packed into the measure each time and that the difference, after stirring or removing some of the moisture, is represented by the extra volume of water held between the particles of curd. Theoretically this would seem to be a satisfactory explanation, because .1 cc.

of water weighs about .1 gram, and .1 is about .6 per cent. of 17.5—to be exact, .57 per cent. In a few cases we found that curds with a lower percentage of moisture had a higher specific gravity, but these were usually abnormal curds—chiefly "fast working" curds or curds with too much acid.

We have hesitated giving these results to the public, but finally decided to do so in order that we may obtain the experience of other workers on the points outlined.

MILK AND CREAM TESTING.

Measuring vs. Weighing Samples of Cream for Testing.

Several of the American States now require that cream shall be weighed into a Babcock bottle when testing for fat instead of measuring the quantity required for a test. If an ordinary 17.6 cc. milk pipette be used the results are too low, but by measuring 18 cc. of cream and being careful to rinse the pipette into the test bottle, fairly accurate results may be got with the pipette and at much less cost for labor. This is specially true for samples testing between 20 and 30 per cent. fat, the specific gravity of which is about the same as water, therefore 18 cc. will weigh about 18 grams. Care, however, should be taken to rinse the pipette into the Babcock bottle after measuring 18 cc. of cream, in order to get all of the measured cream into the bottle. Rinsings, however, should not be put into the bottle when the sample is weighed. Weighing all samples of cream into a Babcock bottle is more accurate than measuring, but measuring is more convenient.

The following table shows the difference in results from testing monthly composite samples of cream by weighing and measuring. These tests were made in April, July, and October, 1906.

No. of sample.	Measuring 18 cc. Per cent. fat.	Weighing 18 grams. Per cent. fat.	Difference.
1	17.5	18	0.5
2	18.5	19	0.5
3	20.5	20.5	0.0
4	22.0	22.5	0.5
5	24.5	24.5	0.0
6	28.0	29.0	1.0
7	28.5	29.0	0.5
8	29.0	29.0	0.0
9	29.0	29.0	0.0
10	29.5	29.5	0.0
11	29.5	29.5	0.0
12	29.5	30.5	1.0
13	30.5	31.0	0.5
14	33.5	34.0	0.5
15	34.0	35.0	1.0
16	36.5	37.5	1.0
17	37.0	38.0	1.0
18	41.0	42.5	1.5

The table shows a difference in the reading of measured and weighed samples ranging from 0 to 1.5. Six samples out of 18, or one-third, gave the same reading whether measured or weighed. One-third of the samples gave a reading of one-half per cent. higher when weighed as compared with measuring. Five samples gave a reading of 1 per cent. higher by weighing, while one sample was 1.5 per cent. higher by weighing as compared with measuring. The tendency is for higher readings when weighing 18 grams of cream into a Babcock test bottle as compared with measuring 18 cc. into similar bottles. The bottles used in all cases were the ordinary wide mouthed cream bottles reading 30 to 40 per cent. fat.

Farrington and Woll, in their work, "Testing Milk and its Products," give the following table of specific gravities of fresh separator cream. We have taken the liberty of quoting this table, and have added a table of corrections for readings of the percentages of fat in cream tests with the Babcock method:

Per cent. fat in cream.	Specific gravity (17.5°C).	Corrections for fat readings when 18cc. cream are measured for a test.
10	1.023	— .23
15	1.012	— .17
20	1.008	— .16
25	1.002	— .05
30	.996	+ .12
35	.980	+ .70
40	.966	+1.36
45	.950	+2.25
50	.947	+2.65

It will be seen by the foregoing that cream testing from 10 to 30 per cent. fat requires practically no correction by using an 18 cc. pipette. Above 30 per cent. the table of corrections will be found much more convenient than weighing samples of cream into the test bottles. Note.—The (—) sign means that this amount is to be subtracted and the (+) to be added to readings.

Comparison of Babcock and Gerber Methods of Testing for Milk Fat.

The composite samples from our own herd of cows were used for the months of March and April, 1906, for comparing these two methods of testing for milk fat, with the following results:

Number of Cow.	*March.*		*April.*	
	Babcock.	*Gerber.*	*Babcock.*	*Gerber.*
	% fat.	% fat.	% fat.	% fat.
15	3.2	3.2	3.3	3.2
17	3.8	3.8	3.3	3.4
21	3.9	3.8	3.9	4.0
26	4.8	4.8	....	....
28	4.4	4.4	4.0	4.0
56	3.7	3.7	3.5	3.6
65	3.8	3.8	....	....
66	4.3	....	4.8	5.0
69	3.6	3.8	3.6	3.7
72	3.5	3.4	3.2	3.1
76	3.3	3.2	3.2	3.1
86	3.5	3.5	....	....
87	3.3	3.2	3.0	3.0
97	5.4	....	5.0	5.0
98	4.8	4.7	....	....
99	4.9	4.9	4.5	4.5

Number of Cow.	*March.* *Babcock.* % fat.	*March.* *Gerber.* % fat.	*April.* *Babcock.* % fat.	*April.* *Gerber.* % fat.
101	4.6	4.5	3.9	3.9
103	4.0	4.1	....	....
104	4.8	4.8	....	....
106	3.3	3.2	3.5	3.5
107	3.8	3.8	3.9	3.9

Conclusions.

With these twenty-one cows' samples, in which the percentage of fat varied from 3.0 to 5.0 per cent., there was in no case a difference of over .2 per cent. fat between the reading as given by the Gerber compared with the Babcock. In most cases the difference was not over .1 per cent. These differences are within the "limits of error" and are no greater than would be found in comparing duplicates with the Babcock test. So far as results comparable with the Babcock are concerned, we should say the Gerber is quite satisfactory. However, the labor of testing is considerably more with the Gerber as compared with the Babcock. The chemicals are also more expensive. After making several comparative tests with the two methods, we are not prepared to recommend the Gerber in preference to the Babcock, although the former is used in Europe in preference to any other short test for determining the fat in milk.

TESTING SAMPLES OF MILK AND CREAM.

We have a great many samples of milk and cream sent and brought to us for testing during the year. One creameryman writes: "I find it a very good way to settle disputes about tests to send the samples to the Dairy department of the College." We are pleased that parties are willing to accept our tests in case of disputes, but this work has grown so largely during the past year that we have been obliged to put a tax of five cents per sample for fat tests, and 25 cents for specific gravity tests and calculation of the solids in milk. This extra work is rather more than we can undertake with our present staff.

During the past year we have tested, for fat only, about 200 samples of milk and cream. Specific gravity tests and calculation of milk solids have been done in about 50 samples. These are in addition to our regular work, and are chiefly samples which have been sent in by mail or express from different parts of the Province. One man sent 27 samples to test for fat at one time, from near Orillia, Ont.

OFFICIAL TESTING OF HOLSTEIN-FRIESIAN COWS.

As intimated in my last report, we have continued to take charge of the "official testing" of Holstein-Friesian cows for both the Canadian and American Associations. Owing to the difficulty of securing proper persons to do the work, we have had to disappoint a number of breeders during the past year. We beg leave to suggest that this work be placed upon a more satisfactory basis than at present. One man could be profitably employed in "field work"—testing cows and giving advice to farmers in the proper management of their herds. This is one of the most valuable lines of work which could be undertaken. To some extent this need is being met by the Dominion Department of Agriculture in the "Cow-testing Associations" which have been formed, but the Province of Ontario could very well afford to keep at least one man in the field doing work of this kind.

At the meeting of the Dairy Teachers and Investigators held at Urbana, Ill., U.S.A., in July, 1906, it was the unanimous opinion of those present that a uniform standard of production should be adopted by all the Dairy Cattle Breeders' Associations. It was felt that there is no reason why the standard for entrance to the "Record of Merit" or "Advanced Registry," or whatever name may be given to the work of dairy performance, should be different for say a Jersey, as compared with an Ayrshire, a Holstein, or a Guernsey.

It was also felt that *yearly records* should be encouraged rather than those for a shorter period of time. We have placed these views before the Dominion Live Stock Commissioner at Ottawa, and also before the various Canadian Cattle Breeders' Associations. The sense of the meeting was in favor of similar standards in both Canada and the United States. As there is a great deal of dairy stock being continually exchanged between Canada and the U. S., it would seem to be in the interests of both countries that similar standards of excellence should be required in each, for the various breeds.

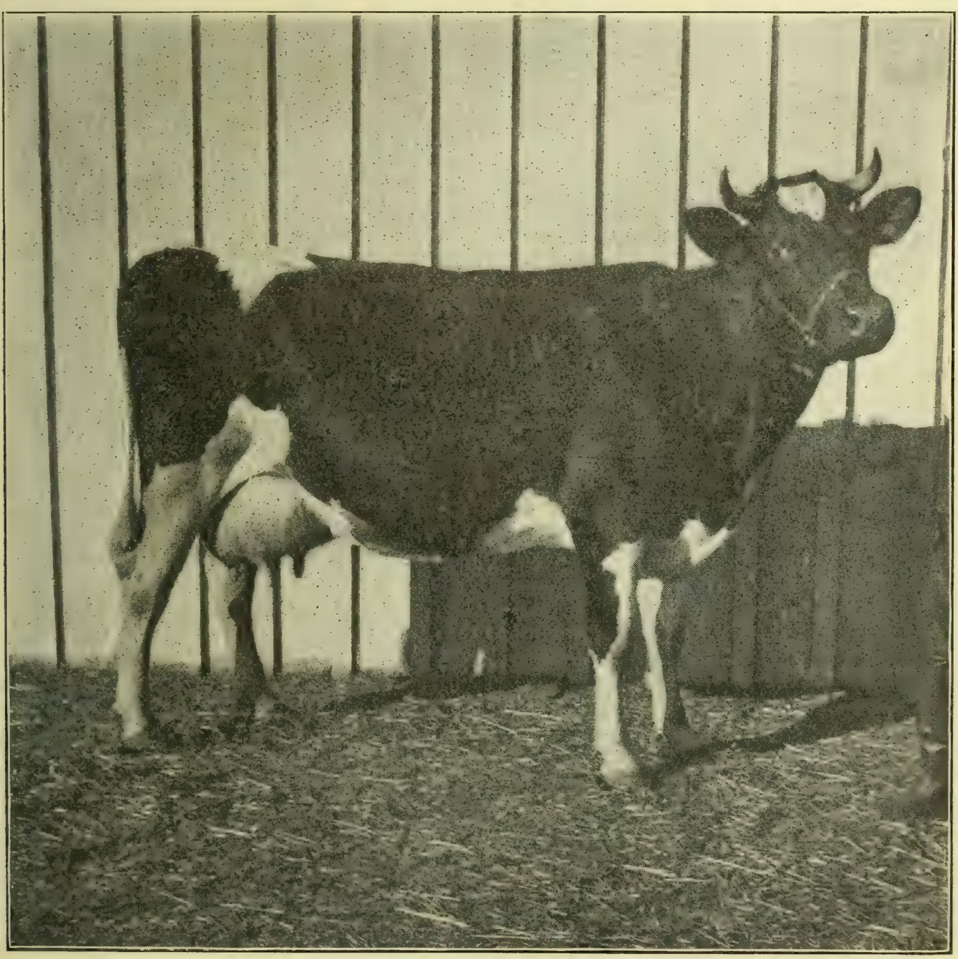
During the past year up to November 15th, 1906, we have supervised official tests of Holstein cows for 22 Canadian breeders, comprising 92 cows. In 1905, fifteen breeders had 63 cows tested. 1906 shows an increase of 7 breeders and 29 cows over last year. Most of the tests were for breeders in Ontario (one in the Province of Quebec) and the tests in most cases were for seven days only. There were two 30-day tests—one for P. D. Ede, Oxford Centre, whose cow gave 1,515.6 lbs. milk and 62.091 lbs. fat in 30 days; the other for Walter Schell, Woodstock, whose cow gave 1,381.5 lbs. milk, and 45.765 lbs. fat in 30 days.

The following list of breeders of Holstein-Friesian cattle, who have had cows officially tested during 1906 by the Dairy department of the College, shows that nine out of twenty-two live in Oxford County, which is recognized as the great dairy county of the Province.

Owner.	Post Office.	County.	No. Cows
I. G. Wychoff	Tyrrell	Norfolk	1
Thos. Hartley	Downsview	York	6
W. W. Brown	Lyn	Leeds	9
Wm. C Stevens	Phillipsville	Leeds	4
McGhee Bros.	Beachville	Oxford	1
G. A. Gilroy	Glen Buel	Leeds	1
F. C. Pettit & Son	Burgesville	Oxford	2
A. H. Teeple	Currie's	Oxford	1
Thos. Davidson	Spring Valley	Leeds	7
Neil Sangster	Ormstown	Quebec	11
Geo. Rice	Tillsonburg	Norfolk	9
Walter Schell	Woodstock	Oxford	7
P. D. Ede	Oxford Centre	Oxford	6
H. Bollert	Cassel	Oxford	3
J. W. Cohoe	New Durham	Brant (farm in Oxford)	1
W. H. Simmons	New Durham	Brant	3
Walburn Rivers	Foldens	Oxford	5
A. C. Hallman	Breslau	Waterloo	5
H. A. Laing	Spring Valley	Leeds	1
S. Macklin	Streetsville	Halton	3
Fred Row	Curries	Oxford	2
Jas. D. Truesdell	Spring Valley	Leeds	4

A GOOD RECORD.

The Holstein-Friesian cow, Boutsje 2nd Pietertje De Kol, No. 6093, C. H. F., which dropped a calf on October 26th, 1906, at which time she was not four years old, gave during the month of November, 1906, 2,522 pounds milk in the 30 days. Her composite sample for the month tested 3.5 per cent. fat. The total pounds of milk-fat for the month were 88.27, which is equal to about 103 pounds of butter. This record is all the more remarkable when we consider "that the average yield of milk in Ontario and Quebec is not much over 3,000 pounds of milk per cow per annum." In one month of 30 days this cow gave nearly as much milk as the estimated yearly yield of average cows in the Provinces of Ontario and Quebec.



HOLSTEIN-FRIESIAN COW. Boutsje 2 Pietertje DeKol No. 6093 C.H.F. Age, 4 years. Owned by Dairy Department, O. A. C. 30 day record, 2,522 lbs. milk, 3.5% fat, 103 lbs. butter ; 7 day record, 643 lbs. milk ; 1 day record, 96 lbs. milk on Nov. 21, 1906.

Her best seven day record was 643 pounds milk. Her best record for one day was 96 pounds, on November 21st.

The day before her large daily record was made she was fed 55 lbs. mangels, 25 lbs. corn silage, 15 lbs. clover hay, 12½ lbs. bran, 7 lbs. ground oats, 3 lbs. corn meal, 3 lbs. oil cake, and 1 lb. gluten feed. She drank during the day about 200 pounds of water. So far as we know, this is the higest Canadian record for a cow for one or seven days, and we doubt if any cow has a verified record for thirty days that is equal to it.

Great credit for this remarkable record is due our herdsman, Mr. Wood, who took full charge of the cow during the test. He milked her four times daily during the thirty days. It was a great pleasure to see the bond of sympathy that existed between the cow and the person who fed and milked her.

The cost of her feed for the month was approximately $8.34. The value of her milk at four cents per quart would be about $40. The value of her butter for the month at 25 cents per pound is about $25. From December 15th, 1905, to November 30th, 1906, this cow gave 11,025 lbs. milk, and 396.69 lbs. milk fat. The cost of her feed during this time was approximately $44.

THE DAIRY HERD.

The herd during the past year has not been so large as usual, as it scarcely averaged 20 milch cows for the year. A number of those in the herd during 1905 proved to be not in calf, some were old and some were unprofitable. These were sold at beef prices in the spring. To some extent their places were filled with four cows purchased during the past year—two Holsteins and two Jerseys at a total cost of $850. We lost one very valuable grade cow with milk fever and one Jersey with brain trouble.

On the whole the season was a very favorable one for the production of milk, and the records would undoubtedly have been much higher had the older cows been milked by hand. Cows that are usually not dry more than six weeks were dry this year from three to five months. This has undoubtedly affected their record to a marked degree. The prices charged the cows for feed were: Hay, $6 per ton; corn silage, $1.50 per ton; bran, $18; gluten feed, $24; corn meal, $24; oil cake, $34; ground oats, $24, and mangels seven cents per bushel. Pasture was charged at the rate of $5 per cow for the season. The feed is not weighed daily, but often enough to give approximately the amount consumed by each cow for the year.

From the herd there was delivered to the Dairy 116,495 pounds milk, of which amount 75,101 pounds were pasteurized, cooled and sent to the College, and 30,635 pounds were delivered to the Macdonald Hall and Institute. In round numbers the value of this milk, at $1.60 per hundred pounds, was $1,200, sent to the College, and $500 sent to the Hall and Institute.

The remainder of the milk delivered to the Dairy from the herd went into the general supply and was used for separating cream sent to the College and Hall, or was made into butter. The surplus milk from the herd would just about furnish the cream sent to the College. There was sent to the College in round numbers 800 quarts of cream and to the Hall and Institute about 1,300 quarts of cream. The value of this cream is about $400.

In addition, the Bursar sold during the year, 7,488 quart milk tickets, worth $312. About one-third of these tickets were used for the purchase of cream from our general supply and about two-thirds represents the value of milk sold by the quart from the herd. The value of milk sold by the quart was approximately $200. The total value of sales of milk from the herd during the year was about $2,000, of which about $800 was cash. This does not include the milk used for rearing calves.

RECORD OF DAIRY HERD FOR 12 MOS., DEC. 1, 1905, TO NOV. 30, 1906.

Rank.	Name or Number of Cow.	Breed.	Age.	Live weight.	No. of days milking.	lbs. of milk.	Average per cent. of fat.	Lbs. of fat in milk.	Lbs. of butter adding ⅙ to fat in milk.	Value of milk-fat @ 18c to 25c per lb	Value of milk @ $1.60 per 100 lbs.	Cost of Feed.	Profit over cost of feed. On milk-fat.	Profit over cost of feed. On milk.
										$	$	$	$	$
1	Adelaide, 106	Holstein	9	1,350	328	11,499	3.47	399.04	465.54	89 89	183 98	44 98	44 91	139 00
2	Boutsje, 107	"	3	1,355	309	11,025	3.59	396.69	462.80	88 78	176 40	44 00	44 78	132 40
3	Abby Marcena, 56	"	5	1,390	248	9,623	3.81	366.70	427.82	84 76	153 97	41 34	43 42	112 63
4	Marjorie Cornelius, 87	"	2	1,010	293	8,151	3.18	259.56	302.82	56 29	130 41	28 72	27 57	101 69
5	Lady Springwood II., 86	Grade Holstein	2	1,127	274	7,602	3.16	240.67	280.78	51 54	121 63	26 69	24 85	94 94
6	Molly De Kol, 76	Holstein	5	1,405	263	7,508	3.16	237.59	277.18	54 29	120 12	33 17	21 12	86 95
7	Lady Rockwood, 78	"	4	1,100	234	6,947	3.35	233.33	272.22	49 57	111 15	29 15	20 42	82 00
8	Daisy De, 72	"	4	1,120	249	6,834	3.48	238.11	277.79	53 56	109 34	33 09	20 47	76 25
9	Molly II., 69	Grade Holstein	4	1,190	302	6,676	3.67	245.30	286.18	53 07	106 81	34 55	18 52	72 26
10	Rena, 70	Ayrshire, Jersey	5	880	288	5,760	5.00	288.17	336.20	61 56	92 16	25 62	35 94	66 54
11	Matty, 101	Grade Jersey	7	1,195	251	5,374	4.32	232.65	271.42	50 19	85 98	28 13	22 06	57 85
12	Mar Corn, 15	Holstein	9	1,415	230	5,127	3.28	168.43	196.53	39 05	82 03	30 24	8 81	51 79
13	Dolly, 17	Grade Holstein	10	1,480	217	5,027	3.31	166.46	194.20	35 98	80 43	30 84	5 14	49 59
14	Daisy Maringa, 90	Holstien	2	1,002	165	4,878	3.35	163.55	190.81	33 10	78 05	(1)15 77	17 33	62 28
15	Glennie, O.A.C,, 97	Ayrshire	3	903	248	4,791	4.42	212.22	247.59	46 80	76 65	26 29	20 51	50 36
16	Patience, 96	"	3	900	247	4,411	3.74	164.98	192.47	35 48	70 57	25 81	9 67	44 76
17	Lady Nancie, 66	"	6	940	233	4,390	3.83	168.46	196.53	37 92	70 24	30 88	7 04	39 36
18	White Clara, 102	"	3	1,110	195	4,190	3 99	167.49	195.40	34 52	67 04	26 60	7 92	40 44
19	Kalopathakes, 98	Jersey	4	820	274	3,952	4.34	171.89	200.54	36 88	63.23	26 24	10 64	36 99

(1) Two year old heifer milking for six months, hence feed charged for half year only. Feed not charged to heifers until after they freshen.

The cows are arranged in the table according to the quantity of milk given, chiefly because the production of milk for sale is the chief business of the herd. The first nine cows are Holsteins and Holstein grades. The records of Nos. 15, 17 and 66 were undoubtedly seriously affected by the use of the milking machine. No. 15 milked for 320 days in 1905 and 230 days in 1906. She gave 9,527 pounds of milk in 1905 and 5,127 pounds in 1906. No. 17 milked for 301 days in 1905 and 217 days in 1906. She gave 8,648 pounds of milk in 1905 and 5,027 pounds in 1906. No. 66 milked 287 days in 1905 and 233 days in 1906. She gave 6,487 pounds of milk in 1905 and 4,390 pounds in 1906. No. 56 gave at least 1,000 pounds less milk compared with what she would likely have done if hand milked, as she milked 313 days in 1905 and only 248 in 1906. In spite of these drawbacks the average for the nineteen cows for the year is 6,514 pounds milk and 277 lbs of butter per cow. This includes all milch cows in the herd for the year, and also three two-year-old-heifers' one of which, No. 90, did not freshen until June, hence her record is for practically only six months. Nos. 106 and 107 began their record the middle of December, 1905, hence for these two cows the record covers only 11½ months.

The records for the herd are not so accurate as in previous years, for the reason that weighing and sampling of the milk was done only once a week from each cow when milked with a machine.

Number and Estimated Value of Dairy Herd, Dec. 1st, 1906.

Breed.	No. of pure-bred cows.	No. of pure-bred heifers.	No. of pure-bred heifer calves.	No. grades.		Total No.	Estimated Value.
				Cows.	Heifers and calves.		
							$
Ayrshire..........	4	2	....	....	1	7	325
Jersey............	3	1	1	2	1	8	330
Holstein-Friesian..	10	5	3	3	1	22	2,145
Total.........	17	8	4	5	3	37	2,800

In addition to the foregoing we have three Holstein bull calves which we expect to sell shortly.

When we took charge of the Dairy herd in 1891 it consisted of nine grade cows worth probably $40 each, or a total of $360. During that year there were transferred from the Farm department to the Dairy two pure-bred Ayrshires, one Jersey and two Holstein-Friesian. The value of these five pure-breds was probably not much more than $250, so that the total value of the herd when we assumed charge sixteen years ago was about $610. We, by mutual agreement, are transferring the herd to the Farm department on January 1, 1907. The Farm department will also assume the responsibility of supplying milk to the College and Macdonald Hall. This will enable us to give more attention to experimental work in the dairy and to the manufacturing branch of the department.

Comments on Herd Record.

The value of the butter per cow at prices paid farmers for milk-fat, and allowing nothing for skimmed milk, varied from $33.10 (a two-year-old heifer) to $89.89. The value of the milk at four cents per quart, varied from $63.23 to $183.98 per cow for the year. The cost of the feed for a cow that was in the herd practically all the year varied from $25.62 to $44.98. The profit over cost of feed varied from $5.14 to $44.91 on butter and from $36.99 to $139 on milk.

The cow Rena, a cross-bred Ayrshire-Jersey, is one of the most economical butter producers in the herd. In quantity and economy of butter production she stands fourth in the herd. Her cost for feed is very low, being but a little over $25 for over 300 pounds butter.

All of which is respectfully submitted.

H. H. DEAN.

GUELPH, DEC. 3, 1906.

PART X.

THE PROFESSOR OF BACTERIOLOGY.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to submit the following report:

Lecture and laboratory courses have been presented as laid down in the College calendar. In the sophomore work it is aimed to give as far as possible, in the course of twenty-five lectures only, a wholesome idea of the nature of moulds, yeasts and bacteria, and the relation of their functional activities to the different phases of farm life.

The senior lectures are of a more technical nature, and the aim is to give the student a more intimate knowledge of the conditions under which he may meet with the various types of micro-organisms in his daily life, that by controlling the conditions he may utilize those organisms which are beneficial and successfully combat those which are inimical to his welfare.

The seniors who elect the biology, dairy, or horticulture option have their lecture work supplemented by laboratory work upon those phases of the science bearing upon their respective options. The seniors electing the agriculture option should receive a laboratory course, without which an accurate conception of the science is impossible. The same for the sophomores.

The course in household bacteriology for the domestic science students has increased to four weeks, including lectures, demonstrations and laboratory work along those lines most intimately associated with problems of the home.

The short course specialists in dairying received twelve lectures and twelve half days' laboratory work in dairy bacteriology, the class having to be divided in order to give all the same work.

Both in the domestic science classes and the short dairy course classes lack of space to accommodate the large number of students is a serious drawback to the proper carrying out of the course, and neither the student nor the instructor can utilize the time to the best advantage under the present conditions.

A course of six lectures and demonstrations has been given to each of the Nature Study classes during the year, and one half day was spent in the laboratory with the dairy instructors.

Two seniors are doing thesis work in this laboratory, and special laboratory instruction has been given to two students during a part of the year.

An address on "Disinfectants and Disinfection" was delivered to the students in the short poultry course.

Contributions have been made by Mr. Barlow and myself to Canadian agricultural, horticultural, and other periodicals.

Routine Laboratory Work and Analysis.

During the year we have distributed 136 doses of tuberculin and 164 lactic acid starters for cheesemakers and buttermakers. The preparation and distribution of cultures for inoculating legumes has been continued, and 375 culture were distributed as follows: Ontario, 121; Nova Scotia, 108; United States, 60; Alberta, 24; Manitoba, 19; Saskatchewan, 14; Prince Edward Isl., 10; Quebec, 5; New Brunswick, 4; British Columbia, 4; South Africa, 4; Porto Rico, 1; England, 1.

Blanks were sent to the recipients of the cultures, asking for a report as to the success or failure of the trials. A large number of these reports have been received, many showing gratifying results of the experiments. As soon as the reports are all in, we purpose presenting the results for publication in bulletin form. An agreement was made with Professor Cumming, of the Truro Agricultural College, whereby the cultures sent to farmers in Nova Scotia were distributed in the name of the Nova Scotia Agricultural College, the reports to be sent to Professor Cumming.

The number of specimens submitted for diagnosis has increased, and the examination of these has consumed a great deal of time. A brief resume of these analyses follows, showing the nature of the specimens and the results of examination of the same:

Blood, 4 samples, 2 for diagnosis of typhoid fever; both negative. 2 for anthrax; both positive.

The throat, 24 samples, suspected diphtheria; 12 positive, 12 negative.

Internal organs, 7 samples, in three of which was found anthrax; in one pneumonia; one was negative for carcinoma; one undetermined was probably aesthenia of fowls; one undetermined was not tuberculosis.

Chickens, 70 specimens affected as follows:—Probable aesthenia, 12; occlusion of cloaca by adhesions, 1; mal-ovulation, 1; tuberculosis, 5; necrosis of liver or other organs, 11; infectious-entero-hepatitis, 5; white diarrhoea, 28; papillary fibromata, 1; fatty degeneration, 1; an undetermined protozoal disease, 4; ruptured ovary, 1.

Turkeys, 3 specimens all infectious-entero-hepatitis, caused by the protozoan parasite, *Coccidium avium.*

Pigeons, 3 specimens, one dead of diarrhoea, the other two submitted for diagnosis of tuberculosis which was not found.

Duck, 1 specimen, death caused by barb of grass in larynx.

Water, 16 samples examined, of which 8 were passed upon as unfit for drinking purposes.

Pus, 5 specimens, as follows:—For tuberculosis, negative; for gleet, negative; for anthrax, positive; for glanders, negative; for gonorrhoea, positive.

Urine, 5 specimens for tuberculosis, all of which were negative.

Sputum, 10 specimens for tuberculosis, 5 of which were positive.

Milk, 6 samples, one astringent, one slimy, two suspected of containing *B. diphtheriae* negative, two in which cream was said to be difficult to churn.

Butter, 1 sample, mouldy.

Cheese, 3 samples, 1 rusty, 2 said to be rancid.

Ice, 1 sample, condemned as unfit for use in drinking water.

Scabs from Cattle, 2 specimens, one of an infection allied to ringworm; one an eruption of the nose and mouth, not determined.

Eczema on human arm, 1 specimen, an infection allied to ringworm.

Tumor, 1 specimen, a fibro-myoma from the cervix uteri.

Swine, 8 specimens, all infectious pneumonia.

Apple twigs, 2 specimens, pear blight.

Pear Twigs, 1 specimen, pear blight.

Lactic acid starters, 2 specimens, "off-flavor;" pronounced good.

Sour corn from a canning factory, 1 specimen, caused by an organism in the water supply.

In all, 177 specimens were examined and the difficulty reported to the sender, and when necessary instructions given for overcoming such difficulty.

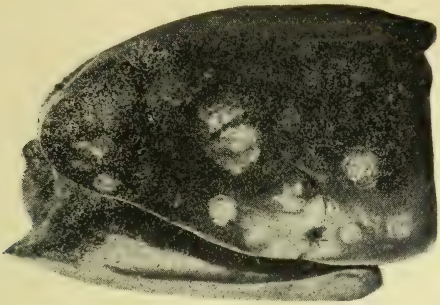


FIG. 1. Liver of turkey that died of infectious entero-hepatitis, or "blackhead."

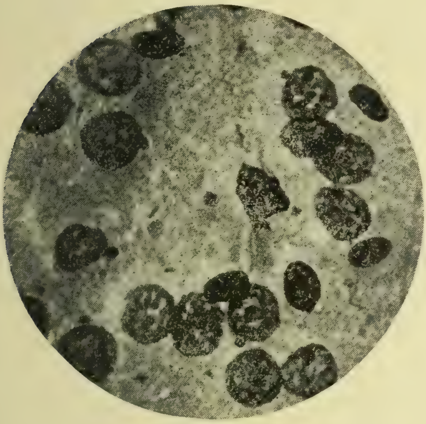


FIG. 2. Coccidium avium, the parasite which causes "blackhead," or infectious entero-hepatitis of fowls. From the liver of a young chicken. The five smaller cells are blood cells.

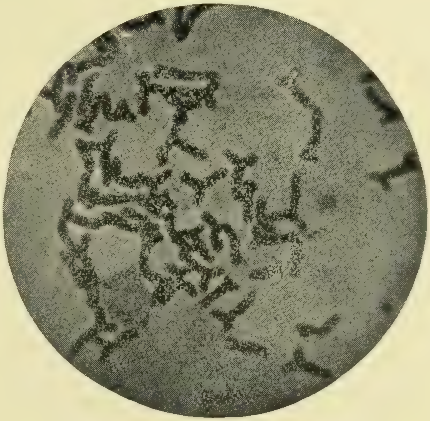


FIG. 3. Large branching bacteria from a nodule of the Horse Bean. Vicia faba. Magnified 1,570 diameters.

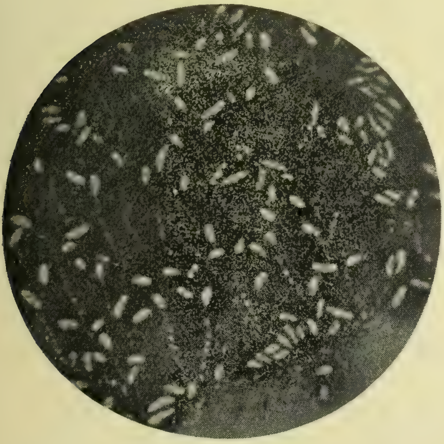


FIG. 4. Bacteria from a pure culture from a nodule of the Sweet Pea, Lathyrus odoratus. Each little rod has a lash at one end by which it moves. Magnified 1,500 diameters.

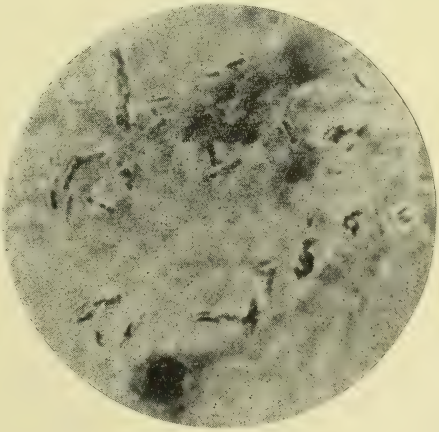


FIG. 5. Germs of tuberculosis in sputum. Such sputum, when carelessly expectorated in public or private places, becomes dried, and the germs being thrown into the air by passing feet, may be inhaled by healthy individuals.

RESEARCH WORK.

In research work several problems have been undertaken, some of which have been finished and others are still under investigation.

As mentioned in my report of last year, we worked out a canning problem for one of the large factories of the Province. This company put up large quantities of tomato pulp in barrels during the rush season, this pulp to be made up later into catsup. Small losses by souring of the pulp had been experienced for three years previous to the fall of 1905, when the loss exceeded six hundred barrels. The factory was visited, samples were secured, and an organism was isolated from the barrels which was found to be capable of souring pulp. We recommended that the barrels be thoroughly fumigated with sulphur. A letter recently received from the president of the canning company states that this year the barrels were fumigated and the temperature of the basement in which the pulp is stored has been kept low, and that only a slight loss from souring of the pulp has been suffered.

We have been, and are still engaged in further studies of the morphology, cultural characteristics and functional activities of the nodule bacteria of leguminous plants, by the aid of which those plants are enabled to secure a nitrogen supply from the air.

Observations upon the bacterial diseases of fruits and vegetables occurring in this vicinity have been made from time to time throughout the year, notes upon which follow:—

Pseudomonas campestris.—This organism is the cause of Black Rot of cabbages and allied plants. During this season it has been found affecting the following plants, all of the genus *Brassica*:

1. B. oleracea Var. acephala—Jersey Kale, Thousand Headed Kale, Curled Kale, Collards.
2. B. oleracea Var. gemmifera—Brussels Sprouts.
3. B. oleracea Var. capitata—Sutton's Best of All Savoy Cabbage; Sutton's Earliest Sheepfold Cabbage; also other kinds of cabbage, red, green and Savoy.
4. B. oleracea Var. botrytis—Purple Sprouting Broccoli, Cauliflower.
5. B oleracea Var. caula-rapa—Early White Vienna Kohl-rabi, Giant Purple Kohl-rabi, Goliath Purple Kohl-rabi.
6. B. napus—Cabbage Leaf Rape, Dwarf Essex Rape.
7. B. campestris—Hartley's Bronze Top Turnips (Rutabaga).
8. B. rapa—White Turnips.

Other named kinds, especially of cabbages and turnips, growing on the experimental plots were affected, but a complete list was not made, and the plants in the above lists were not selected as being especially subject to the disease. It was observed, however, that some kinds were more severely injured than others. For example, the Jersey Kale was more diseased than any other kale.

Bacterium amylovorum.—This bacterium has continued to ravage the fruit trees of Ontario as in the past seasons. It causes fire blight and twig blight of the pear, quince, and apple.

The English Hawthorn, *Crataegus oxycantha*, has been planted in this neighborhood and has escaped from cultivation, so that it is not uncommon along certain streets and lanes. *Crataegus oxycantha*, Var. *splendens*, is a variety of it with double scarlet flowers, and this variety has been planted among the ornamental shrubs on the campus. Early in July of this season, these scarlet-flowered thorns were found to be blighted. The disease had every appearance of fire blight, and most of the infections were blossom infections. A bacterium like *Bacterium amylovorum* was constantly found in great numbers in the blighted stems. Pure cultures were isolated and inoculated in young fruits of the pear and produced the usual reaction for pear blight. A pure culture from the thorn was inoculated in a growing sprout of an apple tree on July 12th, and the symptoms of twig blight appeared in three days. In four days the disease had progressed upward and downward from the point of inoculation, involving eight inches of the twig and causing it to wilt and turn black. The twig was broken from the tree, and pure cultures were isolated of a bacterium resembling *Bacterium amylovorum* in morphology and cultural characters. It has grown in parallel cultures with the organism isolated by us from a typical case of fire blight of the apple, and agreed in every respect with it. The English Hawthorn was examined, but pear blight was in no case discovered, whereas this scarlet-flowered variety of the same English thorn was blighted so severely that its beauty was destroyed for the season, and some older and weaker trees of it were killed outright. There are many species of *Crataegus* growing wild in Ontario, but we have not seen any native species affected with pear blight. For these reasons, we would caution fruit-growers against planting the scarlet-flowered English thorn, and likewise the cut-leafed variety of the English Mountain Ash, *Pyrus aucuparia*, Var. *laciniata*. These ornamental shrubs are both subject to fire blight and are a menace to the orchard.

Bacillus tracheiphilus.—Cucumber wilt appeared late this season and did little injury in this vicinity. We have devoted some study to the cultivation of *B. tracheiphilus*, the organism which causes the disease. It is difficult to isolate this bacillus or to keep it alive, for it grows feebly or not at all in the ordinary media of the laboratory, especially in gelatin media. We have devised, prepared, and tried many special media and have found several in which the organism grows freely, the growth in certain gelatin media being especially copious and characteristic. This work is still in progress.

Slimy Strawberries.—There is no disease of ripe and green strawberries which, though widespread and injurious, appears not to have been described. A translucent spot appears in the affected berry and spreads through the tissue. When the berry is crushed, its turbid juice draws out in slimy threads. An organism giving rise to yeast-like, budding cells was constantly found in the slimy berries, and we have succeeded in isolating it by means of plate cultures in strawberry agar. Work on this organism is in progress, and we hope later to give an account of its morphology and life history.

The Mosaic Disease was observed among cabbages and in the Purple Sprouting Broccoli.

Bacillus oleraceae.—Harrison's Soft Rot or Stinking Rot of the turnip and cauliflower appeared again this year. The cabbages and cauliflowers on the Horticultural department were harvested with but little loss from this disease. Swede turnips or Rutabagas suffered more, and white turnips grown on the Experimental plots rotted to a soft, stinking pulp. Some of our fourth-year students working in the laboratory isolated the bacillus and inoculated it again in growing plants of cauliflower, where it caused a rapid rotting of the head.

Respectfully submitted,

S. F. EDWARDS.

PART XI.

THE PROFESSOR OF HORTICULTURE.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to present herewith my fourteenth annual report on the work of the Horticultural department. For convenience of consideration the work of the department may be grouped under three headings:—

(1) Instruction to students, information given to the public through correspondence, and the publication of articles and reports.

(2) The management of the outside work of the department, including investigations conducted on the College grounds.

(3) College extension work throughout the Province.

A lesson in floriculture—theory.

INSTRUCTION IN HORTICULTURE.

While the public rightly expects much from us, apart from regular College work, we feel that our first duty here is to the students. This includes instruction work given to the regular classes in the First, Second and Fourth Years of the Long Course; also to classes of ladies from Macdonald Institute; to teachers' classes in Nature Study; and to the various Short Courses and Conventions held at the College. Further than that, we are called upon from time to time to supply articles to newspapers and other reports published by the Department.

MANAGEMENT OF THE DEPARTMENT.

That part of the College grounds in charge of the Horticultural department comprises 71 acres. This includes 42 acres in lawn and grounds, 23 acres in orchard and fruit plantation, and 6 acres of vegetable garden, and, in connection with these, we have 8,000 square feet of space under glass in our greenhouses, and during the spring as much more under cold frames. To the general farmer, who has a couple of hundred acres, this may not seem a very extensive area, but the intensive methods practised upon the greater part of it, involve as much labor as is usually put upon a farm ten times the size. The work of the outside department naturally divides into four divisions: The orchard and fruit plantations, the vegetable garden, the lawn and grounds and the greenhouses, flower beds and borders. All of these various branches of the department require close supervision to keep them at all times in first-class condition, as they necessarily must be where we have so many thousand visitors throughout the year, and where everything is supposed to furnish an object lesson for students, as well as visitors.

A lesson in floriculture—practice.

Weather conditions the past season have been favorable for horticultural crops of all kinds. While many parts of the Province suffered from drought, we had an abundance of rain; in fact so much during the early part of the season that it was difficult to get on with the work and keep down weeds. The lawn and grounds never looked fresher and better than they did throughout the whole of the year, and the fruit and vegetable crops of most kinds were excellent.

EXPERIMENTAL WORK.

At a College of this kind, where the instruction of students receives first consideration, experimental work must necessarily take second place. Investigations are being conducted, however, along a number of important lines of work, among which the following may be noted: Variety tests with apples, pears, plums, cherries, grapes, raspberries, blackberries, currants, gooseberries, and strawberries; tests with orchard cover crops; tests with tomatoes and a large number of garden crops such as beets, carrots, cabbage, cauliflower, celery, lettuce, onions, radish, etc.; plant breeding with fruits and vegetables. Tests are also being made of a large number of ornamental plants for outdoor and greenhouse culture. Some of these will be briefly reported upon in the following pages.

TREE FRUITS.

Ten years ago we set out an experimental orchard, made up of a large number of varieties of all the tree fruits which it was thought might be grown in this locality. In this orchard the trees have had a more or less severe struggle for existence against the unfavorable nature of the soil, and the severe climatic conditions which prevail at this place. The land, though thoroughly underdrained, is not well adapted to fruit, and the disastrous winter of 1903-4 killed the greater number of the less hardy kinds of trees. The gaps have been filled with more hardy kinds, but it is quite evident we shall always be more or less seriously handicapped here in the growing of many kinds of fruits.

Practice in the use of Seeders and Wheel-hoes.

Apples have stood the adverse conditions better than most of the other tree fruits. Our orchard now contains about 120 varieties, and new varieties are being added from time to time by grafting into trees which have been planted for this purpose. A careful record is being kept of each tree in order to enable us to compare the individuality of different trees of the same variety. In these records are noted the vigor and hardiness of each season's growth, the age of bearing, the date and amount of bloom, the amount of crop, kind and quality of the fruit. In a few years these notes will afford valuable data for guidance in the selection of individuals for plant breeding and propagation.

The apple crop this year was on the whole a little below the average on account of the heavy crop last year.

Those varieties which fruited this year are grouped in the following lists, according as they bore a heavy, medium, or light crop:

Those which bore heavily were: Duchess, Gano, Gideon, Gravenstein, Grimes, Longfield, Seek-no-further, Trenton, Wallbridge, Wealthy, and the Martha Crab.

Those which bore a medium crop were: Alexander, Acubafolia, Ben Davis, Bellflower, Canada Baldwin, Colvert, Golden Russet, Haas, Hare Pipka, McIntosh, Northwest Greening, Shackleford, Tolman, Wellington, and the Montreal Beauty and Whitney Crabs.

Those which bore a light crop were: Astrachan, Babbit, Benoni, Bethel, Blenheim, Fallawater, Fameuse, Fall St. Lawrence, Jonathan, Hubbardston, Lawver, Magog, Maiden's Blush, McMahon, Ontario, Primate, Pewaukee, Rhode Island Greening, Northern Spy, Scott's Winter, Tetofsky, Yellow Transparent, Wolf River, and the General Grant, Hyslop, and Transcendant crabs.

Pears have been more or less of a failure here. About 150 trees, including 40 varieties, were planted at the time the orchard was set out ten years ago, but only a few of the trees planted at that time now survive. The most of them failed after the severe winter of 1903-4. Of the survivors, Flemish Beauty, Clapp's Favorite, Manning's Elizabeth, Lincoln, Ritson, and Bessemianka, bore a light crop this year.

A lesson in tree planting.

Plums have also suffered on account of the adverse soil and weather conditions. Our orchard contains 30 European, 6 Japanese, and 22 American varieties. Of the European varieties, Glass appears to be one of the hardiest. Among the others of that type which fruited this year were: Coe's Golden, Grand Duke, Imperial Gage, Monarch, and Reine Claude.

The American varieties are quite hardy, but are much inferior to the European. The following varieties of this type bore heavily this year: Hawkeye, Hoskins, Keith, Cyclone, Col. Bryan, De Sota, Penning Free, Rollingstone, Stoddard, Stella, Wyant, Wolf and Weaver.

Cherries.—Only the hardiest varieties of cherries of the sour type have been able to stand the climate here. Of these, the Early Richmond and Montmorency have proved the best.

ORCHARD COVER CROPS.

The value of a cover crop of some kind in the orchard is now pretty generally recognized by all up-to-date fruit-growers. The most successful fruit-growers give their orchards clean cultivation from the early spring till about the middle or end of July, when tree growth should cease. A cover crop of some kind is then sown immediately after the last cultivation. Such a crop benefits the orchard by affording protection to the tree roots if the ground is bare of snow in winter, in holding snow as an additional cover when it comes, in checking a late growth of trees in the fall, in taking up plant food from the soil which might otherwise be lost by leaching, and, above all, by adding to the fertility and friability of the soil when the crop is turned under in the spring.

An orchard cover crop. Soy beans.

For the past four years we have been conducting an experiment in our orchard for the purpose of determining what are the best kinds of cover crops to use, and also what rate of seeding will give the most satisfactory covers. The following notes by Mr. H. S. Peart, of this department, give these particulars with the crops sown this fall and last.

COVER CROPS, SPRING OF 1906.

The following notes taken April 24th on the cover crops sown July 28th and 29th, 1905, will show their relative values as winter covers:

Hairy Vetch, sown at the rate of 35 pounds per acre, made a good fall cover, but over one-half of the plants killed during the winter, the rest only half covering the ground. This is a rather unusual occurrence, as vetch is usually quite hardy.

Crimson Clover was killed outright.

Alfalfa, sown at the rate of 30 pounds per acre, wintered in first-class condition, and the desired winter cover was maintained. The plants at this are making a vigorous growth.

Rye, sown at the rate of 1½ bushels per acre came through the winter in good condition and commenced growth early in the spring. The winter cover formed by rye is all that could be desired.

Dwarf Essex Rape was all killed, but the stiff stems were useful in holding the snow.

Red Clover, sown at the rate of 20 pounds per acre, came through the winter very well, and made a good growth early in the spring.

Mammoth Clover, sown at the rate of 20 pounds per acre, appeared similar to Red Clover. Both are good cover crops.

Hairy Vetch, 20 pounds, and *Mammoth Clover,* 10 pounds per acre. The vetch was nearly all killed and the clover was only about one-half thick enough to make a good cover.

Alfalfa, 15 pounds, Red Clover 8 pounds per acre wintered very well, but the alfalfa overgrew and nearly smothered out the clover. Few, if any, of the mixtures have proved equal to the same crops sown separately.

Grass Peas killed with the early fall frosts, and were mostly decayed before spring.

Crimson Clover, Horse Beans, and Prussian Blue Peas were all killed, and furnished but little cover of any kind.

Cow Horn Turnips were killed during the winter and the decaying roots made a very objectionable odor in the spring.

Of the crops tested, the following may be named as the most satisfactory: Alfalfa, Red and Mammoth Clover, Rye, and Hairy Vetch. Probably Crimson Clover might be added to the list for Southern Ontario, but it is not hardy enough here.

COVER CROPS IN FALL OF 1906.

The following notes on the autumn condition of the cover crops sown July 19th and 20th, 1906, taken after killing frosts had cut down the tender ones, will furnish some information regarding the relative merits of the different crops in the autumn.

Alfalfa, sown at the rate of 30 pounds per acre, made a good growth of about 10 inches, and formed an even close mat on the ground 2 inches thick. The tallest stalks were beginning to show frosted leaves, but the ground cover was quite green.

Rye, sown at the rate of 1½ bushels per acre, grew to a height of 12 inches and formed an even, dense mat, about 3 inches thick over the ground.

Dwarf Essex Rape, sown at the rate of 8 pounds per acre, formed a heavy even cover. The plants grew to a height of 2 feet, but were broken down to about 8 inches. The frost up to this time (Nov. 14th) had not yet killed the plants. Owing to the great height of this crop, the harvesting of the fruit in the orchard was rendered rather unpleasant.

Red Clover, sown at the rate of 20 pounds per acre, made an even heavy covering about 2 inches thick. So heavy was the covering that fallen apples did not settle to the ground but were held on top of the cover.

Mammoth Clover, sown at the same rate as the Red, made a similar growth. It would be very difficult to distinguish one from the other at this time.

Hairy Vetch and Mammoth Clover, mixed in the proportion of 20 pounds of vetch and 10 pounds of clover per acre, formed a good close mat about 2½ inches thick, but the clover tended to smother out the vetch. The results of several years' tests go to show that mixtures of this kind are not as good as either clover or vetch sown alone.

Alfalfa and Red Clover, mixed at the rate of 15 pounds of alfalfa and 8 pounds of Red Clover per acre, made a good even cover, but the mixture has nothing to recommend it over either crop sown alone.

Grass Peas, sown at the rate of 2 bushels per acre, made a heavy growth of about 4 feet, but killed down until only a very light cover of frozen straw remained. The peas did not make sufficient growth to check weed growth, and the chickweed made a fairly strong growth under the peas.

Horse Beans, 30 pounds, Prussian Blue Peas, 30 pounds, and Crimson Clover, 10 pounds, per acre gave poor results this season. The peas and beans made but a short growth, and the clover was not sown heavy enough to make sufficient cover. In former years this mixture has given excellent results as a summer cover after strawberries.

Soy Beans, sown at the rate of 2 bushels per acre, made a strong stand of plants, but the crop was killed by the severe frost of Oct. 11th, and very little of it remained to cover the ground for winter.

Hairy Vetch, sown at the rate of 35 pounds per acre, made a dense even cover fully two inches thick, and was like a thick velvety carpet under foot. This is a very desirable cover crop.

Crimson Clover, sown at the rate of 20 pounds per acre, formed a thick, heavy mat about 4 inches thick,—many of the plants reaching a height of 8 or 10 inches. If this crop would only live through the winter, it might be one of the best.

Further notes on the condition in which these crops come through the winter will be taken next spring.

Bush Fruits.

When the department was established fourteen years ago, we began extensive variety tests with all of the fruits which it was thought could be grown in this locality, including bush fruits, such as raspberries, blackberries, currants, and gooseberries. The first plantations set out reached their limit of usefulness in eight or ten years, and new plantations were made, in which the work is now being carried on.

Raspberries.—We are now fruiting our third plantation of raspberries which has been set out since this experimental work began. Sixty varieties were fruited in the second plantation and thirty are still under test in the new plantation. Without entering into details, the following may be named as a few of the varieties which rank among the best in the trials so far: *Red*: Marlboro, for early, Cuthbert, for late. Herbert, a new variety originated with Mr. R. B. Whyte, Ottawa, has made a good record, and this year ranks first among the red varieties. *Purple*: Columbian; *Black*: Older and Smith's Giant. The Older has for a number of years proved to be one of our hardiest and most productive black raspberries. It usually comes through the winter uninjured when other varieties are seriously frozen back. Golden Queen is the best yellow raspberry.

Blackberries.—After ten or twelve years' testing of twenty-three varieties of blackberries, among which were included the hardiest known varieties, we have to report that this fruit cannot satisfactorily be grown here. Similar reports have also been received from many of our co-operative experimenters from many parts of the Province. The blackberry is one of the tenderest of the bush fruits, and requires favorable soil and locality to do well. The Eldorado and Agawam have proved the hardiest where they can be grown.

Currants.—Currants are among the hardiest of the bush fruits, and have usually given good results here. Forty-six varieties have been under test, among which the following may be named as the best: *Red*: Red Cross, Victoria, and Fay's Prolific. Raby Castle often yields better than any of those mentioned, but the fruit is much smaller and does not compare with Fay or Victoria, either for home use or for market. White Grape ranks first among the *white* varieties, and has usually been one of the most productive yielders in the whole plantation. From among twenty-two *black* varieties under test, Black Victoria, Naples, and Champion, have proven the best taken on an average of several years. The Climax, a new variety, gave the largest yield this year, but it will require further testing before it can be recommended in place of the others mentioned.

Gooseberries.—Of the forty-five varieties under test, thirty-six fruited this year. Our most productive varieties have always been those of American origin, such as Pearl and Downing. A new variety, called Lady Leicester, has for the past three years given the heaviest crop, but the fruit is like that of the old Houghton, too small, hence it cannot be recommended for general planting. Of the large-fruited varieties, Red Jacket and Whitesmith have proved the best, but they are not nearly so productive as Pearl or Downing.

Strawberries.—The strawberry has always proved one of our most reliable fruits, and over four hundred varieties have been carefully tested here during the past ten or twelve years. This year we had nearly one hundred new varieties under test, and had an excellent crop from which to judge of their qualities. So far none of them appear to be superior to the old reliable kinds which have been mentioned in our previous reports. From our experiments so far we would recommend the following as a few of the best to cover the season from early to late: *Early*: Splendid, Warfield, and Haverland; *Midseason*: Williams, Ruby, Clyde, and Parson's Beauty; *Late*: Buster. The last is a large, light colored berry which for several years past has ranked among the heaviest yielders. It is well worthy of a trial for home use or market, although its light color makes it undesirable for canning.

PLANT BREEDING.

We were able this year to make more progress in plant breeding than ever before. Mr. J. W. Crow, one of our undergraduates, was employed at plants of various kinds, and a great number of crosses were made. The following notes by Mr. Crow give a brief outline of the work in progress:

The plant breeding operations begun in previous years were continued this year and several new lines of work were begun. Careful observations were made on the second fruiting of ninety-two strawberry seedlings and one hundred and four raspberry seedlings, and on the fourth fruiting of sixteen strawberry seedlings. Several would appear to be of promise, but so many conditions of soil and weather affect the yield and quality, especially of strawberries, that more extended tests will be necessary before the merits of any can be definitely decided. The crossing of these fruits was continued and considerably extended.

A large number of berries were produced as the result of using pollen of Falstaff, a European raspberry, on Herbert and Cuthbert raspberries. A combination of the quality and size of the European berry with the hardiness of the native species is hoped for. A purple-cane variety, Columbian, belonging to the species *Rubus neglectus*, was successfully crossed with the Strawberry-Raspberry (*R. rosaefolius*).

One of the objects aimed at in the cross-breeding of raspberries is the production of a variety as early as Marlboro but with the productiveness and quality of Cuthbert. Considerable difference was noted in the time of ripening of Cuthbert plants grown under the same conditions and a selection of those ripening the first appreciable quantity of fruit was made. These will be propagated from as extensively as possible and subjected to continuous rigid selection with respect principally to the period of ripening. In this way also it is hoped that the desired end may be attained.

It is to be regretted that in the past very little attention has been given to the improvement by cultivation of our native fruits. We have allowed the limits of our fruit-growing areas to be largely determined by the tenderness of the varieties which our ancestors brought from the old land. The hardiness of our native cherries, for instance, would seem to justify attempts to improve them in other respects, but hitherto no such attempt has been made. A careful examination of the wild trees of the common choke cherry, *Prunus Virgiana*, of this vicinity revealed considerable variation in the size and quality of the fruit borne, while nearly every tree over three or four years of age produced an abundant crop. Some trees were found which produced fruit much less astringent than the ordinary choke cherry and measuring nearly .45 of an inch in average diameter. From these several hundred pits were planted, and the seedlings will be carefully cultivated, in the hope that still further improvement may be made.

Several other lines of work were begun and many crosses with flowers and other plants were made. Valuable experience has been gained, and it is the intention to still further enlarge the scope of effort. The work which can be done here is, however, limited in extent. The pressing needs of the Niagara district grower are in no way identical with those of growers in localities which possess a climate similar to that at Guelph. It is well known that varieties are pre-eminently suited to the localities in which they originate, hence our efforts must of necessity be extended to other localities where fruit is being largely grown.

VEGETABLE GARDENING.

The growing importance of the market garden industry in Ontario is evidenced by the number of associations of vegetable growers which have been formed in various parts of the Province during the past year. Until now these growers have, as a rule, been working along independently and often at a great disadvantage because they were not in touch with one another, nor did they receive the reports and bulletins sent out by the Government to the members of such organizations as the Farmers' Institutes and Fruit Growers' Associations. These Vegetable Growers' Associations will also receive our reports and bulletins, and, like the other organizations, will find us ready to give them all the assistance possible.

This year we began a series of systematic variety tests with a number of the leading garden crops. It has been said by some that such tests are of no use, but judging from the endless list of varieties offered by seedsmen, and the results already obtained from our experiments, we realize that much valuable information has yet to be gained through such tests. After we have determined by careful testing which are the best varieties, we will then be in a position to look for the development of new and better varieties by selecting and breeding from the best of those we now have.

The crops with which the most extensive experiments were made this year were, beets, of which we grew 52 varieties, carrots, 26 varieties, cabbage 68, cauliflower 22, lettuce 72, onions 51, radish 68, and tomatoes 73. A list of leading varieties compiled from these experiments, together with descriptions of the most promising of the newer varieties is being printed in the report of the Fruit Experiment Stations for 1906, copies of which may be had on application to the Department of Agriculture, Toronto.

FLORICULTURE.

There is a growing demand each year for information regarding the most suitable kind of plants for beautifying home surroundings. In order to furnish information of this kind, as well as to provide material for the instruction of students, we have for several years been giving considerable attention to the growing of the various classes of flowers used in the flower garden. In our report last year was given a list of fifty of the most desirable kinds of hardy perennial plants for use in perennial borders. These plants we consider among the most desirable for the amateur, and to all interested in such we would recommend that list.

Among the annual flowers there are also quite a number which will always be favorites with the amateur. For a number of years we have grown over a hundred different kinds of hardy annuals, and in the following list give a few of those which we believe are among the best for the amateur's garden. Most of these may be sown out-of-doors as soon as the ground is sufficiently dry in the spring, usually about the end of April.

Aster.
Amaranthus
Alyssum.
Balsam.
Calendula.
Calliopsis.
Candytuft.
Delphinium (Larkspur).
Dianthus.
Eschscholtzia (California Poppy).
Gaillardia.
Kochia Scorpia (Summer Cyprus).
Malope grandiflora.
Marigold.
Mignonette.
Nicotiana sylvestris.
Nicotiana affinis.
Nasturtium (climbing and dwarf).
Rudbeckia bicolor.
Phlox Drummondi.
Poppies (single and double).
Salpiglossis.
Scabiosa.
Sweet Pea.
Stocks (Ten-week).
Zinnia.
Wallflower.

Climbing Annuals.

Cobea Scandens.
Ipomea or Convolvulus (in variety).
Tropaeolum (Climbing) (in variety).

The following are a few of the Biennials and Perennials that can be grown as annuals by sowing early indoors and transplanting outside about the end of May. If sown out of doors, they flower very late in the season..

Ageratum.
Antirrhinum (Snap Dragon).
Pansy.
Petunia.
Salvia.
Verbena.
Wallflower.

The dahlia and gladiolus are among the most useful of the bulbous and tuberous rooted plants for summer flowering and should be much more largely grown.

New Greenhouses.

During the summer our old greenhouses which had served their time and were becoming dilapidated through decay, have all been replaced by new and modern structures. In the construction of these, we have tried to combine the latest and most approved ideas regarding suitability for the work, convenience, and durability. Concrete and iron have been used largely instead of wood, and we believe we now have as durable and complete a set of houses as could be desired for our purpose.

With the increasing demand upon us for more attention to classes and experimental work, it has been found necessary to change to some extent the nature of the work carried on in the greenhouses, so that much of the space and time formerly given to the culture of plants and flowers for decorative purposes will in future have to be given to classes and experimental work.

Two houses will now be devoted entirely to the growing and forcing of vegetable crops, and two to the culture of flowering and ornamental plants, particularly those adapted to the requirements of home decoration.

While the largest house of all, what was formerly the old conservatory, will be used as a laboratory or work house for our ever-increasing classes of boys and girls.

Addition to Collection of Wax Models.

One of the features of greatest interest to visitors at the College of late years has been the valuable collection of models of fruits and vegetables in the Horticultural section of the College Museum. These wonderful reproductions are made for us from the natural specimens by Mrs. Stanley Potter, who has been engaged at this work here for some time. This year she has, among other things, made a specialty of representing the effects of fungus diseases and insects upon fruit and vegetables, and has also been making for us a collection of the edible fungi and the poisonous species likely to be mistaken for them. We hope to keep her at this work till our collection is the most complete of its kind to be found anywhere on the continent.

Co-operative Experiments in Fruit Growing.

During the past ten years extensive variety tests with a great number of fruits have been carried on at the College and at the twelve Ontario Fruit Experiment Stations in various parts of the Province. These tests have enabled us to determine what are some of the best varieties of each kind of fruit for the sections in which they have been tested. Through the agency of the Experimental Union we have been distributing throughout the Province these leading varieties, that they may be further tested in every township of the Province, and in this way each grower may select for himself and grow more extensively the varieties which give the best results on his own particular farm. About 2,000 experimenters are already engaged in this work, and we desire the co-operation of all who are interested in fruit-growing.

Details of this experimental work in horticulture are given in the Report of the Experimental Union, which may be had an application to the Department of Agriculture, Toronto.

The plants are sent by mail free of any expense. All that we require before sending plants is a promise that the experimenter will try to follow the directions and will report the results each year when required to do so. Anyone in Ontario who wishes to join in this work next spring may do so by selecting any one of the experiments and agreeing to follow the directions given and to report the results as required. Applications should be made to H. L. Hutt, Ontario Agricultural College, Guelph.

Co-operative Experiments with Tomatoes.

A co-operative experiment was undertaken this year for the purpose of determining which are the best varieties of tomatoes, both from the grower's and the canner's standpoints. Seed was selected of twelve of the leading varieties, and furnished to a few of the most successful tomato growers in those sections where canning factories have been established. This experiment was conducted in the following districts: Sandwich, Leamington, Dresden, Dunnville, St. Catharines, Jordan, Grimsby, Hamilton, and Burlington.

From all of these places we have received reports of successfully conducted experiments, which go to show that the varieties in favor by the growers vary somewhat in different parts of the Province.

At each place where the experiment was conducted, the manager in charge of the canning factory was asked to report upon the quality of the varieties for canning purposes, and some of these reports show that the varieties most profitable for the grower are not always the best for the canning factory. A fuller report of this experiment will be brought out later in the form of a bulletin.

Exhibit Made at Toronto.

An educational exhibit was made by this department at the Ontario Horticultural Exhibition held in Toronto from Nov. 5th to 10th. This exhibit was made up of a large number of varieties of fruits and vegetables grown at the College, and Mr. H. S. Peart was in attendance during the whole time of the exhibition to give information regarding the exhibit and the work in progress at the College.

Acknowledgments.

In closing this report I wish to thankfully acknowledge the hearty co-operation and assistance we have received from the other departments of the College, and to one and all in this department who have labored with me to make the work of value to our students and the public at large.

Respectfully submitted,

H. L. HUTT.

PART XII.

THE PROFESSOR OF ANIMAL HUSBANDRY AND FARM SUPERINTENDENT.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit herewith the report for my department. This report covers the whole work of the department, including that performed by my assistant, Mr. H. S. Arkell, who has taken an active part in planning and conducting experiments, as well as in the work of instruction.

Teaching, as heretofore, has been an important feature of our work during the year. It includes a great deal more than our work with the regular college students, and takes in our work with the short course students, farmers' institutes, stock judging classes, and a variety of public meetings with similar objects, together with answers to questions received through the mail. This part of our work, however, scarcely admits of a detailed report, as it would not be of general interest.

FARM SUPERINTENDENCE.

The rotation and the methods of cultivation in practice upon the College farm are fully described in previous reports, and, as these reports are available to the public, I beg leave to omit a repetition of the description in this report.

Crops.—Our crops during the past season were, approximately, as follows:

81 acres hay, of which 57 acres was first crop of mixed timothy and clover, and the balance second year meadow, which was mostly timothy. The average yield was a little over two tons per acre.

38 acres Mandscheuri barley. This variety of barley continues to give good satisfaction. This year's crop is not yet threshed, but it was a very heavy crop, and should run close to 60 bushels per acre.

96 acres Siberian oats. The oats were very heavy in the straw and lodged badly. Owing to this fact, the sample is not good, though the yield will be very fair. Only part of the oats are as yet threshed.

10 acres Giant Yellow Intermediate mangels. This year the mangels were sown on ridges. Germination was good, and the yield 980 bushels per acre.

4 acres Magnum Bonum Swede turnips. The yield was 600 bushels per acre.

8 acres Empire State potatoes. In spite of repeated spraying, a sort of dry rot struck the potatoes, cutting the yield down to 93 bushels per acre.

21 acres White Cap Yellow Dent corn, for the silo. This variety has given xcellent satisfaction the past two years, being a good yielder and maturing early. The yield this year was about 15 tons per acre of exceptionally well eared and well matured corn.

In addition to the above mentionel crops, we had about 10 acres of rape and 60 acres of pasture. The mixture which we sowed this year for a two-year pasture, comprised 5 pounds orchard grass, 4 pounds timothy, and 8 pounds red clover per acre. This mixture has given very good satisfaction in the past.

LIVE STOCK.

An important addition to the live stock was made last February, by the purchase of three pure-bred Clydesdale mares from Mr. Robert Davies, Todmorden. Two of these mares were in foal, and we unfortunately lost one of them in foaling. The most valuable mare, however, gave us an excellent colt foal by Right Forward, the champion Clydesdale stallion at Toronto this year. If this branch of our work is to be developed, additional accommodation will be necessary.

Important additions have also been made to our other classes of stock, and we feel that we are in a better position than ever before to do effective work in live stock breeding.

INVESTIGATION.

Our investigations during the year have dealt with the relative value of short keep and long keep steers for feeding purposes; the relative merits of feeding steers in loose boxes and tied in stalls; the cost of raising pigs from birth to market; and a commencement in the cross-breeding of swine, though the last mentioned branch of our work has not been carried far enough to justify a detailed report.

Through the liberality of the Wm. Davies Co., of Toronto, we have also been able to carry on some important co-operative experiments with swine, and a report upon this work, so far as it has gone, is appended. This is not the first time we have received valuable assistance from the Wm. Davies Co., and we take pleasure in acknowledging our great obligation to this progressive firm.

EXPERIMENTS WITH LIVE STOCK.

COST OF RAISING PIGS.

This work was begun last year, and has been continued throughout the present year. There are numerous factors entering into such an investigation, almost any of which might be made the subject of controversy, therefore it has been thought advisable to repeat some of the discussion which appeared under this head in last year's report.

Valuation of Foods.—This is a question upon which it is impossible to secure unanimity of opinion. If all foods had to be purchased, it is quite manifest that the foods should be charged against the pigs at exactly what they cost. In the case of home grown foods, however, the question is complicated. In the first place, the trouble of cleaning and marketing is avoided, and, secondly, a great deal of small, unmarketable grain and seeds are included in the grain ration. Then again, prices vary from time to time, and in calculations of this kind, it is desirable to fix fair average prices which are likely to prevail for a number of years. The feeder must also study the market for cheap foods. If he makes an injudicious selection of foods, it is not fair to lay the blame upon the animals. For example, bran can be bought in Guelph at $17.00 per ton, middlings run from $19.00 to $20.00 per ton, and feeding barley can generally be bought off farmers' waggons at from 45 cents to 47 cents per bushel. On the other hand, oats, peas and corn are so dear at present as to be practically out of the question for hog feeding, unless for some special purpose where cost is a secondary consideration. Therefore, if the feeder is careful in the selection of foods, and if some allowance is made for the unmarketable grain included in home grown feed, we think that a valuation of $20.00 per ton for meal, including bran and middlings, is not unreasonable. As to other foods, we have valued skim milk at 15 cents per cwt. and roots at $2.00 per ton.

Cost of Maintaining Sow.—This is a matter upon which there may be some controversy. We have figures representing the actual cost of feeding sows while suckling pigs, but the cost of maintaining sows between litters is rather difficult to arrive at, owing to the fact that pasture plays an important part in the maintenance, and many foods can be used which have very little market value. We think, however, that we are making a liberal estimate when we place the cost of maintaining a sow which is not suckling pigs at 75 cents a month. At some seasons it will be more, but at other times it will be decidedly less, and we think 75 cents per month is a reasonably liberal average allowance. Therefore, if the sow raises two litters of pigs during the year, and nurses each litter six weeks, it will leave about nine and one-quarter months of maintenance between litters, which, at 75 cents per month, amounts to $6.94, or say $7.00. Half of this amount, or $3.50, must, therefore, be charged against each litter, in addition to the cost of food consumed by sow and pigs before the pigs are weaned.

Valuation of Sow.—A young grade sow about eight months old and not bred, can be bought at a very reasonable price, and after the farmer is through with her, he can sell her for practically as much as she cost, provided she makes a reasonable growth and is well cared for. For this reason, we are omitting the value of the sow from the calculation.

Risk.—This is a factor which is very difficult to deal with, and because there are no means of arriving at a satisfactory basis for an estimate, we are leaving the element of risk out of the calculation.

Labor and Manure.—The amount of labor involved depends upon conveniences, methods of feeding, and the number of pigs, the cost of labor per pig being less where a large number of pigs is involved than when only a few are kept. It must not be forgotten, however, that if the pigs are to be charged with every item of expense, they should also be credited with everything they produce, and a product of considerable value is their manure. But, to arrive at a fair and reasonable valuation of the manure is no simple matter, so, to simplify the calculation, we shall make no charge for labor, and allow no credit for manure. This method is not scientific, and no doubt it is not exact, but it possesses the merit of simplicity, and the difference, one way or the other, between the values of these two items, cannot affect the calculation in hand to any material extent.

Cost of Maintaining Sow and Pigs.—In this calculation, only the food consumed by the sow and young pigs during the nursing period is considered. Twelve litters of pigs enter into the calculation. The pigs were weaned at six weeks old. The ration was composed mainly of middlings and bran in the proportion of 2 to 1 by weight. Sometimes a small proportion of ground oats was added to the ration, the oats being ground in the condition in which they came from the threshing machine. Sometimes skim milk was available, but at other times it was not. All food was carefully recorded and valued as previously described. The following table gives particulars regarding each litter:

Cost of Maintaining Sow and Litter for Six Weeks.

Sow and Litter.	No. of Pigs in Litter.	How Bred.	Cost of Feeding Sow and Litter.
			$
No. 1	4	Pure York	3.20
No. 2	9	Berk. boar, Tam. sow	3.08
No. 3	6	Pure York	3.87
No. 4	5	York. boar, Tam. sow	3.70
No. 5	8	York. boar, Tam. sow	3.04
No. 6	3	York. boar, Berk. sow	5.85
No. 7	9	Berk. boar, York. sow	4.31
No. 8	8	Pure York	4.33
No. 9	8	Pure Tam	3.88
No. 10	8	York. boar, Tam. Sow	3.94
No. 11	6	Tam. boar, Berk. sow	3.33
No. 12	4	Tam. boar, Berk. sow	2.37
Average	6½		3.74

From the above table it will be seen that the twelve litters averaged 6½ pigs each, and that the average cost of the food consumed by the twelve sows and their litters for a period of six weeks was $3.74.

Total Cost of Pigs Until 6 Weeks Old.—To arrive at the total cost of a litter of pigs until they are weaned, we must add any other legitimate charges to the sum of $3.74, as given above. If the sow produces two litters per year, which is a fair assumption, we should charge against each litter one-half of the cost of maintaining sow when not nursing pigs, together with service fee. Therefore, if we omit the items of interest on investment, risk, labor, and value of manure, and charge meal at $20.00 per ton, skim milk at 15c. per cwt., roots at $2.00 per ton, and maintenance of dry sows at 75c. per month, the bill against the average litter of pigs used in this experiment would be as follows:—

Service fee	$1 00
Cost of maintaining dry sow (½ of $7.00)	3 50
Cost of food for sow and litter	3 74
Total	$8 24
Average number of pigs in litter	6½
Average cost per pig 6 weeks old	$1 27

The average cost of a pig at six weeks old as shown by this experiment, corresponds very closely with our results of last year, and indicates that it is very much cheaper to raise pigs than to buy them.

Cost of Finishing for Market.—The pigs in litter No. 1 were not finished for market, being sold for breeding purposes at an early age. Litters No. 2 to No. 6, inclusive, have been marketed, and the following table gives details regarding them:

Table Showing Cost of Finishing Five Litters for Market.

	Litter No. 2, Berk. boar, Tam. sow, 9 pigs.	Litter No. 3, Pure York, 6 pigs.	Litter No. 4, York. boar, Tam. sow, 5 pigs.	Litter No. 5, York. boar, Tam. sow, 8 pigs.	Litter No. 6, York. boar, Tam. sow, 3 pigs.	Average.
	$	$	$	$	$	$
(*a*). Cost of food, birth to weaning	3.08	3.87	3.70	3.04	5.85	3.91
(*b*). Cost of food, weaning to marketing	62.10	35.93	37.47	59.95	14.95	
(*c*). Cost of food, birth to market	65.18	39.80	41.17	62.99	20.80	
(*d*). Live weight when marketed	1468 lbs.	993 lbs.	906 lbs.	1522 lbs.	586 lbs.	Per pig 176 lbs.
(*e*). Cost of food per lb. live wt., birth to market	4.44	4.00	4.54	4.14	3.55	4.20
(*f*). Total cost of pigs, including service fee and maintenance of dry sow	69.68	44.30	45.67	67.49	22.30	
(*g*). Total cost per lb., including service fee and maintenance of dry sow	4.74	4.46	5.04	4.43	4.31	4.61

Explanatory Notes.

1. It should be explained that the pigs used in this experiment were late summer and fall litters, and that they were all fed throughout the winter of 1905-06. The litters were marketed March 3rd, April 6th, May 8th, June 8th, and August 9th, respectively, so that, with the greater number of pigs the main part of the feeding was done throughout the winter.

2. It will be noted that the average cost from birth to weaning of these five litters is higher than the average of the twelve litters included in the previous table. This is due to the fact that Litter No. 6 is included in the average, and this litter, for some reason, cost very much more than any other. Of course, it was also included in the other average, but it has more influence upon the average when it is one of five, than when it was only one of twelve litters.

3. The figures opposite division (f) of the table were obtained by adding a fixed charge of $4.50 to the cost of food from birth to market, as shown opposite division (c) of the table. This fixed charge, as previously explained, is made up of $1.00 for service fee, and $3.50 for half the cost of maintaining the sow when not nursing pigs. Of course, the addition of a fixed charge of this kind makes a greater difference in the total cost per pound of a small litter than it does in the case of a larger litter, and since two of the five litters are decidedly small, we are inclined to regard the average total cost per hog of $4.61, as rather extreme. However, we shall be able to speak more definitely upon this point when more pigs have been marketed.

4. It is too soon to say anything regarding the relative merits of different crosses. As an example of the influence of individuality, it is interesting to compare litters No. 4 and No. 5. Though bred the same way, by the same boar and out of sows closely related, there is a marked difference in the cost of food per pound live weight.

5. Until further work has been performed, these results must be regarded as merely tentative.

CO-OPERATIVE EXPERIMENTS WITH SWINE.

This work supplements our own investigations in connection with the cost of raising hogs for market. The work was made possible by the Wm. Davies Co., Limited, of Toronto, who generously offered to pay for finished hogs, 50 cents per cwt. above the market price prevailing at the time they were marketed, to farmers who would render a full report upon the food consumed by the hogs from weaning until marketed, and upon certain other points necessary to an intelligent study of the question. The details of the work were entrusted to our department, and, up to the time of writing, ten reports have been received from farmers who conducted experiments according to directions. The work, so far as we know, is unique, and the results should be of interest and value to those interested in this important industry. It should, perhaps, be explained that the farmers were allowed to feed the pigs in their own way, and the only rules prescribed were those pertaining to the nature of the facts to be reported. Each report bears a declaration, signed by the experimenter that it is correct.

Cost of Young Pigs.—In our own experiments with 12 litters, the average cost per pig, counting everything (except risk) which we thought could be fairly charged against each litter, was $1.27 at weaning time. To be on the safe side, however, we have charged the pigs used in these experiments at $1.50 each, at weaning time. It must be remembered that the prime object of all this work is to increase our knowledge of what it *costs* the farmer to *raise* pigs and finish them for market. In our general average, however, we have also worked out the cost of these hogs on the basis of $2.50 each for pigs at weaning time, for the satisfaction of those who *buy* young pigs for feeding.

Valuation of Foods.—For what may be called supplemental foods, we have used the following values: Skim milk and buttermilk, 15c. per cwt. Roots, $2.00 per ton. Green foods, $2.00 per ton. Whey, 4c. per cwt. These values may be open to question, but it is the meal ration which has the greatest influence upon the cost of feeding, and it will be noticed in the table that we have worked out the cost per pound on the basis of four different values for meal, viz., $20,00, $21.00, $22.00, and $23.00 per ton; our desire being to show what might be regarded as the extreme limit of cost. The term meal includes bran, shorts, etc., as well as ground grain. We could not use the values furnished by our experimenters, because it was necessary to have uniformity of values for purposes of comparison. The exception to this rule will be found in the column under the heading "food consumed." Where values for pasture and miscellaneous foods appear in this column, they represent the values attached to these foods by the experimenters, with the exception of Lot 8, where we added what we thought a rather excessive charge for pasture, judging by the statement of what the pigs received.

The table which follows looks somewhat formidable, but it is a table of such exceptional interest that we cannot see any way of curtailing it without detracting from its value. Every lot is worthy of study, and a more intelligent understanding of the general averages will be obtained by studying the figures from which they were computed.

Table I.—Details of Co-operative Experiment.

Lot.	No. of Pigs.	How bred.	Cost of Pigs when weaned.	Age when sold.	Weight when sold.	Food Consumed.	Cost per lb. when Meal is worth per ton—			
							$ 20.00	$ 21.00	$ 22.00	$ 23.00
			$	Days.	lbs.		c.	c.	c.	c.
No. 1...	9	York. boar, Grade Tam and Chester White sow.......	13.50	217	1,800	Barley, 3,552 lbs. ; shorts, 905 lbs. ; mangels, 740 lbs. ; green clover, 2,850 lbs. ; milk, 1,620 lbs.........	3 56	3.68	3.80	3.93
No. 2...	12	Yorkshire..........	18.00	224	2,425	Barley, 5,374 lbs. ; shorts, 1,169 lbs. ; mangels, 815 lbs. ; green clover, 3,900 lbs. ; milk, 2,160 lbs.........	3.77	3.90	4.04	4.17
No. 3...	12	Yorkshire..........	18.00	247	2,360	Meal (barley, shorts, peas, oats), 7,333 lbs. ; mangels, 545 lbs. ; milk, 2,520 lbs..........................	4.05	4.21	4.36	4.52
No. 4...	10	Yorkshire..........	15.00	238	2,050	Meal (barley, peas, oats), 5,171 lbs. ; shorts, 1,038 lbs. ; mangels, 3,200 lbs. ; milk, 2,050 lbs..............	4.05	4.21	4.36	4.52
No. 5...	7	Berk. boar, York. sow..............	10.50	233	1,525	Barley, 1,960 lbs. ; wheat, 1,300 lbs. ; oats, 800 lbs. ; mangels, 6,000 lbs. ; milk, 8,800 lbs....................	4.58	4.71	4.84	4.97
No. 6...	10	York. boar, Tam. sow..............	15.00	177	2,060	Meal (barley, oats, wheat, peas), 4,215 lbs. ; shorts, 816 lbs. ; whey, 15,000 lbs. ; miscellaneous foods valued at $5.00....................	3.70	3.82	3.94	4.07
No. 7...	14	Yorkshire..........	21.00	213	2,740	Barley, 1,243 lbs. ; shorts, 4,600 lbs. ; corn, 1,585 lbs. ; milk, 9,330 lbs. ; small potatoes (3 bags) and pasture, valued at $5.90..............	4.20	4.33	4.47	4.61
No. 8...	7	Yorkshire grade...	10.50	194	1,300	Meal (barley and oats) 2,230 lbs. ; shorts, 274 lbs. ; milk, 3,960 lbs. ; pasture and green feed valued at $5.00..............................	3.57	3.67	3.69	3.36
No. 9...	14	Berk. boar, grade York. sow	21.00	179	2,740	Meal (barley and peas) 10,016 lbs. ; mangels, 3,300 lbs. : milk, 4,020 lbs................................	4.76	4.94	5.12	5.31
No. 10..	8	Tam. boar, grade York & Tam. sow	12.00	200	1,740	Barley, 3,115 lbs. ; shorts, 390 lbs. ; mangels, 600 lbs. ; milk, 1,200 lbs. ; 51 days on stubble, without other food..................	2.84	2.94	3.04	3.14

Comments.

1. A peculiar feature of the experiment is the predominance of Yorkshire blood in the pigs used. This probably has no significance, but it may call for the explanation that no stipulation was made in the conditions of the experiment, regarding the breeds to be used. Any breed, grade, or cross was eligible.

2. There is a remarkable coincidence in lots 3 and 4. The cost per pound of these two lots is practically the same, yet one lot was fed in Ontario county, and the other in Bruce.

3. Another coincidence occurs in lots 7 and 9, both as regards number of pigs and market weight, yet one of these lots came from Ontario county, and the other from Waterloo, points widely distant.

4. As previously explained, the pigs are valued at $1.50 each at weaning time, which is considerably above the actual cost shown by our experiments.

5. Lot 7 was made up of two litters, born the same day, but marketed about a month apart. The 213 days represent the average age of these pigs when marketed.

6. It will be noted that each lot was well up to, and that some of them were above market requirements as to weight. The weights were taken from duplicate weigh tickets, issued by the weighmaster where the pigs were marketed.

7. The cost of gain is more uniform than one might expect from hogs fed under such widely different conditions. Lots 9 and 10 are the two extremes, and call for special notice.

8. It is hard to understand the high cost per pound in the case of lot 9. Looking at the ration which was used, we must say that barley and peas do not look like a good meal ration for very young pigs. On the other hand it must be admitted that the pigs made remarkably good gains, as they were scarcely six months old when marketed, and averaged 195 pounds. It is possible, however, that though the pigs were not injured, they did not make the best use of the meal and that there was waste from this cause. If it does nothing else, this group illustrates the point that rapid gains are not necessarily cheap gains.

9. In the case of lot 10 the owner had a field of mixed oats and barley which was very badly lodged. Consequently there was a great deal of grain left on the ground after harvest. The pigs were turned on the stubble August 1st, and stayed there until September 20th, receiving no food but what they gathered for themselves during that time. As it is manifestly impossible to place a value upon such food, this group is not included in the general average, but it is inserted in the table as an example of how farm animals can frequently make profitable use of what would otherwise be wasted.

Table II.—Averages.

	When meal is worth per ton—			
	$20.00	$21.00	$22.00	$23.00
	$	$	$	$
Average cost per pound of 95 pigs, omitting lot 10, when pigs cost $1.50 each at weaning time	4.07	4.21	4.35	4.49
Average cost per pound of 95 pigs, omitting lot 10, when pigs cost $2.50 each at weaning time	4.57	4.71	4.85	4.99

Average age at which pigs were weaned, 52 days.
Average age at which pigs were marketed, 214 days.
Average live weight of pigs when marketed, 200 lbs.

Comments.

1. In both tables there is much of encouragement to swine breeders and feeders. The general average shows results from 95 hogs fed upon eight different farms, and reflects great credit upon the skill of the feeders.

2. That the average cost per pound should be within 5c., when meal is valued at $23.00 per ton, and the pigs at $2.50 each when weaned, is much beyond our expectations.

3. We regard $20.00 per ton a fair valuation of meal when the grain is home grown, as it includes much that is not marketable. Even when much of the feed has to be bought, we believe that, with a little foresight, the meal bill can be kept well under $22.00 per ton. If the farmer buys injudiciously, or uses unnecessarily high priced foods, he should not blame the pigs.

4. These experiments show cheaper average gains than were obtained in our own work, but most of these experiments represent summer feeding, whereas most of our feeding was done during the winter.

5. The experimenters who conducted this work are Messrs. W. J. Cunningham, Nicolston; J. A. McKenzie, Columbus: Robt. Bray, Walkerton; James Scott, Galt; I. T. Gleason, Lakeside; W. G. Smale, Woodville; W. A. Rowand, Walkerton; Geo. Johnson, Cannington.

FATTENING STEERS FOR EXPORT.

Short Keep vs. Long Keep Steers.

By a short keep steer, we mean one which has sufficient weight and flesh at the time of purchase, that he can be made ready for export in from two to three months of stall feeding. By a long keep steer, we mean one which requires five or six months of stall feeding before ready for export. It is a difficult matter to decide which of these classes is the more profitable to handle at prevailing prices, because the short keep steer always costs more per pound than the long keep, and it is important for the farmer to know whether there is as much difference in value as the market demands. The problem is complicated by the fact that there are different grades of short keep and long keep steers, some steers being of much better quality than others; but in these experiments we aim to select reasonably good average steers of the two classes.

Plan of Experiment.—In this experiment the short keep steers are divided into two groups, the heavier ones being put in one group, and the lighter ones in another. There were 11 steers in each group. The object was to market the heavy steers first, and thus have two grades of short keep steers; but, as it turned out, both groups were ready for market at practically the same time, and both went away together. They are reported separately because the method of feeding was somewhat different, the heavier group being fed a heavier meal ration. The short keep steers were fed for a period of sixty days.

A group of lighter and thinner steers was purchased to represent long keep steers. These steers were fed the same kinds of food used for the others, but the meal ration was increased much more slowly, and they were on experiment 153 days. Originally, there were eight steers in this group, but one of them turned out badly, and was discarded as unsuitable for experimental work. Only seven steers, therefore, are included in the report upon long keep steers.

Feeding.—All the steers were fed at first a mixture of cut hay, pulped roots, and silage, mixed in the proportion of approximately, 1 of hay, 2 of roots, and 3 of silage, by weight, but it was found necessary to reduce the amount of silage considerably, after about six weeks of feeding.

During the first month of the experiment, all the steers were fed a meal ration consisting of 1 part of bran to 3 parts of ground barley by weight. After this time a small proportion of ground oats and corn was added to the mixture, but barley and bran constituted the main part of the meal ration throughout the experiment.

The heavy short keep steers were started on about 5 pounds of meal each per day, and the quantity increased, until, before the close of the experiment, they were getting about 10 pounds of meal each per day. Their average daily consumption of meal amounted to .607 pounds meal (a little less than 2-3 of a pound) for every 100 pounds of their average live weight.

The lighter short keep steers were started on about 4½ pounds of meal each per day, and the quantity was increased more slowly. The average daily consumption of meal for this group amounted to .556 pound meal (a little less than 3-5 of a pound) for every 100 pounds live weight of the animals.

The long keep steers were started on about 4 pounds of meal each per day, and increased very slowly. Their average daily consumption of meal was .489 pound meal (less than ½ pound) for every 100 pounds of their average live weight.

The meal was fed in two feeds on top of the mixture of hay, roots and silage.

Value of Foods.—The foods are valued as follows: Meal, $20.00 per ton; Hay, $8.00 per ton; Roots, $2.00 per ton; Silage, $2.00 per ton. For a discussion of the valuation of foods, see report upon swine experiments. It must also be remembered that values fluctuate considerably, and we wish to use what will represent fair values, which may be employed from year to year. Furthermore, this experiment is concerned with the relative merits of different classes of feeding steers, whereas the profit or loss upon a given operation in steer feeding is often affected quite as much by skill, or luck, in buying and selling, as by skill in feeding. Whether the values we employ be high or low, they will enable us to compare these groups of steers, and that is the only object we have in view.

Table Showing Weights, Gains, Food Consumed, Cost of Gain, etc.

——	Group I., 11 steers. Heavy Short Keep.	Group II. 11 Steers. Lighter Short Keep.	Group III. 7 Steers. Long Keep.
Average weight of steers at commencement of experiment.......	1454.1 lbs.	1267.7 lbs.	1053.5 lbs.
Average weight of steers at close of experiment.	1550.9 lbs.	1357.7 lbs.	1302.1 lbs.
Average gain per steer	In 60 days. 96.8 lbs.	In 60 days. 90.0 lbs.	In 153 days. 248.6 lbs.
Average daily gain per steer	1.61 lbs.	1.5 lbs.	1.62 lbs.
Food consumed....................	Meal ... 6,025 lbs. Hay.... 4,820 " Roots... 9,560 " Silage ..13,100 "	Meal ... 4,905 lbs. Hay .... 4,700 " Roots... 9,280 " Silage...12,910 "	Meal ... 6,181 lbs. Hay ....10,529 " Roots...23,563 " Silage...19,970 "
Value of food	$102.18	$90.04	$147.46
Cost of 1 lb. increase..............	9.59c.	9.09c.	8.47c.
Average meal consumed per steer, per day, per 100 lbs. live weight..	.607. lb	.566 lb.	.489 lb.

Explanatory Notes.

1. It will be noticed that the gains are not large. This is probably due to some trouble we had with the steers. The silage on the top of the silo contained very little grain, but after about six weeks, silage was reached that was rich in grain, and the result was that the steers commenced to scour. The proportion of silage in the ration was reduced, and the trouble stopped in a very short time, but we feel sure that it interfered very materially with the gain in weight.

2. It will be noted also that the cost of a pound of increase in weight was highest in the case of the heavy short keep cattle, and lowest in the case of the long keep steers. This result is quite in accord with previous experiments, where we found that, invariably, a heavy meal ration resulted in higher cost per pound increase in weight.

3. The cost of producing the increase in weight, however, is not the only factor in determining the relative profits or losses in feeding the different kinds of steers. The weight of the steer when purchased is an important factor, as is also the condition of the steer when purchased. This can be shown by working out an example. Let us assume that all these steers were sold at the same price, say 5c. per pound, and that the long keep steers cost 4c. per pound. This assumption happens to fit the facts of the case, as the long keep steers cost 4c. per pound, and both long and short keep steers were sold at 5c. per pound. Let us take an average long keep steer (weight when bought, 1,053½ lbs., weight when sold, 1,302 lbs.) and determine the profit or loss according to the values we have attached to the foods:

Cost price of steer, 1,053½ lbs. at 4c.	$42 14
Value of food	21 06
Total cost	$63 20
Selling price, 1,302 lbs. at 5c.	$65 10
Profit above market value of food	1 90

Now, let us take an average heavy short keep steer, and determine what we could afford to pay for him so that we could sell him at 5c. per pound, and get back the value of his food, and profit of $1.90 above the value of the food, as in the case of the long keep steer. To do this, we must deduct from his selling price the value of the food he consumes, and the profit made on the long keep steer. Thus:

Selling price, heavy short keep steer, 1,551 lbs. at 5c.	$77 55
Deduct: Value of food, $9.29 Profit, $1.90	11 19
Value of steer when bought, to give same results as long keep steer	$66 36

That is to say, we could have paid $66.36 each for this bunch of heavy short keep steers, and have secured the same profit per head above value of food, as we did in the case of the long keep steers.

But these heavy short keep steers averaged 1,454 lbs. when bought; therefore, if 1,454 pounds are worth $66.36, 100 lbs. would be worth $4.56. In other words, if we had paid $4.56 per cwt. for the heavy steers, and $4.00 per cwt. for the long keep steers, in this particular case, and sold them all at 5c. per pound, we would have had exactly the same profit per steer above market value of the food.

When we work out the lighter short keep steers in the same way, we find that they would be worth $4.55 per cwt. as compared with the long keep steers at $4.00 per cwt., and the heavy short keep steers at $4.56 per cwt.

4. The results of this experiment, and the discussion up to this point, suggest two important questions which should be perfectly understood by every man who buys cattle for feeding. The questions are as follows:

(*a*) Why is it that though the lighter short keep steers were fed more economically than the heavy ones, and made their increase in weight at a lower cost per pound, they would still have to be bought at a shade lower price per cwt. than the heavy steers, in order to give the same profit?

(*b*) Why is it that there should be such a wide difference (55c. per cwt.) between what a farmer could afford to pay per cwt. for the long keep steers, and the lighter short keep steers; and such a narrow difference (1c. per cwt.) between what he could afford to pay for the lighter short keep, and the heavy short keep, considering that the long keep steers made their increase in weight 62c. per cwt. cheaper than the lighter short keep, whereas the lighter short keep made their increase in weight only 50c. per cwt. cheaper than the heavy short keep steers?

The answer to question (*a*) is simple, if we remember that the farmer's profit is made by increasing the value per pound of the original weight of the steer. Thus, if he increased the value of the original weight of the heavy short keep steers by 1 cent per pound, the increase would amount to $14.54 per head; whereas, in the case of the lighter short keep steers, an increase of 1 cent per pound in the value of the original weight, would amount to only $12.67 per head, making a difference of $1.87 per head in favor of the heavier steers. The more economical method practised in feeding the lighter short keep group, very nearly wiped out this difference, but there would still be a slightly larger profit on the heavier steers, if both groups had been bought at the same price and sold at the same price per pound.

Question (*b*) is more complicated. In the first place, the short keep steers were heavier, and this fact counted in their favor as explained under question (*a*). But another important factor enters into this problem, viz., the long keep steers were thinner than the short keep, and had to be increased in weight 248.6 pounds per head before they were finished, whereas, the short keep steers were finished by increasing their weight only 90 pounds per head. If this increase in weight could be sold for as much per pound as it costs, it would make little difference whether the steer were thin or fleshy when bought, but such is not the case. If both these lots were sold at 5 cents per pound, there would be a loss of 4.09 cents per pound of increase in the case of the short keep steers, and a loss of 3.47 cents per pound of increase in the case of the long keep cattle. (See table for cost per pound increase.) Let us see how this works out:

Total loss per head incurred on increase in live weight necessary to finish cattle for export:

Long keep steers, 248.6 lbs. at 3.47c.	$8 63
Short keep steers, 90 lbs. at 4.09c.	3 68
Difference	$4 95

Thus, while the loss is less per pound of increase in the case of the long keep steers, yet the total loss is greater, owing to the fact that more pounds of increase were necessary to finish them.

Now, the only way to make up this loss, is to increase the value per pound of the original weight of the steer, and, therefore, the greater the loss to be made up, the greater must be the increase in the value per pound of the original weight of the steer.

From what has been said, it will be seen that the light short keep steers, as compared with the heavy short keep steers, labored under only one disadvantage, viz., they were lighter in weight; but the long keep steers as compared with the short keep steers, were under a double disadvantage, in that they were both lighter and thinner.

5. The points brought out by this experiment may be summarized as follows:

(1) To feed steers cheaply, the meal ration should be kept as low as possible consistent with securing a reasonable gain in weight.

(2) Heavy, fleshy (short keep) steers may be fed a heavier meal ration per 100 lbs. live weight, than lighter and thinner steers, and give an equal profit, making allowance for their greater first cost per pound.

(3) The lighter and thinner the steers, the greater the need for economizing in regard to the meal ration.

(4) Condition being equal, heavy steers are worth more per pound to buy as feeders, than lighter ones, the selling price per pound being the same.

(5) Weight being equal, a fleshy steer is worth more per pound to buy as a feeder, the selling price per pound being the same.

(6) The lighter and thinner the steer, the greater the "spread" between the buying and selling price per pound necessary to compensate the man who feeds him.

(7) In this experiment, steers which weighed 1053.5 pounds each when bought, which were increased 248.6 pounds each in weight, and were sold at 5c. per pound, required a "spread" of $1.00 per cwt. between the buying and selling price, to give a profit of $1.90 per head above value of food; whereas a "spread" of only 45c. per cwt. between the buying and selling price, gave an equal profit per head on steers sold at the same price per pound, which weighed 1267.7 pounds each when bought, and required to be increased in weight only 90 pounds per head in order to finish them.

(8) The results of this experiment must not be regarded as conclusive. They indicate, however, what may happen in feeding steers, and seem to be in accord with the best practice in steer feeding. We expect to have further figures upon this subject next year.

Feeding Steers Loose vs. Tied.

In this comparison, one group of steers is represented by the eleven lighter short keep steers, mentioned in the previous experiment. Uufortunately, we have accommodation for only four steers to run loose, so that the groups are unequal in numbers. The steers fed loose were dehorned before they were bought.

The method of feeding the lighter short keep steer has already been described, and the loose steers were fed the same ration. On the whole, however, they consumed slightly more meal than the tied steers, though an effort was made to keep the meal ration as nearly alike as possible in quantity for the two lots.

The steers fed loose were not affected by scouring as were those tied in the stalls, and no doubt a good deal to their advantage over the tied steers is due to this fact. It indicates, however, that steers running loose are less liable to scour than those kept tied, which may be taken as one of the advantages of loose feeding.

Table Showing Weights, Gains, Food Consumed, Cost, etc.

	Group I. 11 Steers. Tied.	Group II. 4 Steers. Loose.
Average weight per steer at commencement of experiment	1267.7 lbs.	1212.5 lbs.
Average weight per steer at close of experiment	1357.7 lbs.	1351.2 lbs.
Average gain per steer in 60 days	90.0 lbs.	138.7 lbs.
Average daily gain per steer	1.5 lbs.	2.31 lbs.
Food consumed	Meal... 4,905 lbs. Hay ... 4,700 " Roots .. 9,280 " Silage .. 12,910 "	Meal... 1,777 lbs. Hay ... 1,990 " Roots, . 3,910 " Silage.. 5,560 "
Value of food	$90.04	$35.20
Cost of 1 lb. increase in weight	9.09 c.	6.34 c.
Average meal consumed per day, per 100 lbs. average live weight	.566 lb.	.577 lb.
Profit per steer, above first cost and value of food	$4.56	$6.02

Explanatory Notes.

1. It will be noticed that the loose steers made a much greater gain than those kept tied, and at a much smaller cost per pound.

2. As stated before, no doubt much of this advantage was due to the fact that the loose steers suffered no set back from scouring.

3. The steers cost $4.35 per cwt., and were sold at $5.00 per cwt. This is a comparatively small "spread" between cost and selling price per pound, yet it leaves a margin on the right side of $4.56 per head in the case of the tied steers, and $6.02 per head in the case of the loose, above first cost and value of food.

4. The difference of profit in favor of the loose steers would have been greater if the loose steers had been of the same weight as the tied. It will be noticed by the table that they were rather lighter steers, and were thus at a disadvantage as previously explained.

5. As in the previous cases, these results must not be taken as conclusive. We are repeating this feature of the work along with the others, and expect to have additional data next year.

Respectfully submitted,

G. E. DAY.

PART XIII.

PROFESSOR OF FIELD HUSBANDRY AND EXPERIMENTALIST.

To the President of the Ontario Agricultural College:

Sir,—I have the honor of submitting herewith a report of the work done in the Department of Field Husbandry for the year 1906. At the close of the year 1905, Prof. C. A. Zavitz was granted a year's leave of absence from duty, and I was given charge of the work of the Department during his absence. The work of the year has been arduous, but on the whole pleasant, and I have been cheerfully and ably assisted by Mr. W. J. Squirrell in the delivering of lectures and the general work of the department, by Mr. H. G. Bell, B.S.A., in the work of plant breeding, and by Mr. A. E. Whiteside, who has been foreman of the field work for some years. At the end of April, Mr. C. C. Thom, B.S.A., who has been with us for about a year, was transferred to the department of Physics, and soon afterwards Mr. C. R. Klinck, a graduate of the present year, took Mr. Thom's place in this department and remained with us during the summer.

Improvements in the Department.

In the past we have had considerable trouble with animals straying on the campus from the public roads and finding their way to the experimental field, where occasionally damage was done by these intruders. During the year a first class wire fence has been erected between the experimental field and the campus, which will effectually prevent all further trouble.

A few years ago when the experimental barn was moved to its present location, the roof was considerably racked, and in consequence had to be patched in several places to prevent leakage. This year we found that the shingles were again giving away on some parts of the roof, and we have therefore procured metal roofing similar to that on the farm barn, and this will be put on as soon as the spring opens up.

A marked improvement has also been made in our method of storing samples of seeds. In the past we have used cotton bags for this purpose, but as injury was constantly being done by mice and other vermin, it was deemed advisable to procure a sufficient quantity of tin cans to take the place of the small cotton bags. The seeds are now being placed in these cans, and they will be labelled and placed in systematic order on suitable shelving in the granary. The use of the cans will not only preserve the seeds in much better condition, but will also facilitate the work of the department.

A few slight changes in the interior arrangement of the Experimental Building, and the placing of some additional furniture in the offices during the year, has greatly facilitated the inside work.

General Outline of the Work in Field Husbandry in 1906.

1. The conducting of experiments in field agriculture on upwards of 2,000 plots at the Ontario Agricultural College.

2. The breeding of plants by systematic selection and by cross fertilization in order to improve some of the best old varieties and to originate new ones of greater value.

3. The directing of co-operative experiments on about 3,700 farms throughout Ontario. The report of the results of the co-operative work will be found in the annual report of the Ontario Agricultural and Experimental Union.

4. The furnishing of seeds and instructions for illustration plots on the exhibition grounds at Simcoe, Ontario.

5. The delivering of lectures to the freshmen, sophomore and senior class students, as outlined in the College calendar; also to the students taking the dairy course, to those taking the short course in stock and seed judging, and to those taking the nature study course at the Macdonald Institute.

6. The delivering of popular lectures to various gatherings of farmers as follows: Fifty or sixty in the experimental grounds to the thousands of excursionists who visited the College in the month of June; one at the annual meeting of the Canadian Seed Growers' Association, Ottawa; one at the Spring Seed Fair in Fergus; one at the Fall Fair in Simoce; one at the Provincial Winter Fair, Guelph; two at the conference of Institute workers held at the College in November, and three at the annual meeting of the Experimental Union, held at the College.

7. The writing of agricultural reports and articles. This includes the report of the Experimental department at the College and of the co-operative experimental work throughout Ontario; also articles on agricultural subjects which were sent to the farm journals and newspapers occasionally throughout the year.

8. The carrying on of a very heavy correspondence with farmers, seedsmen, directors of experiment stations, etc., during the greater part of the year.

9. The judging of grains, roots, potatoes, etc., at agricultural exhibitions. Within the past year, the writer, or some other member of the staff of this Department, acted as judge at the following fairs: The Spring Seed Fairs at Guelph and Fergus; the Autumn Seed Fair, Guelph; the Fall Fairs at Guelph and Simcoe; the Consolidated School Fair, Guelph, and the Provincial Winter Fair, Guelph.

10. The fulfilling of duties required of the Secretary of the Ontario Agricultural and Experimental Union.

EXPERIMENTAL WORK.

The work in the Experimental department consists in planning the various experiments; laying out, seeding, and looking after the field plots; harvesting, threshing, weighing and testing the grain; taking up, weighing counting, testing and storing the potatoes and roots; cutting, weighing and harvesting the grass, corn and fodder crops, etc., and also in picking by hand the samples of grain grown on the plots, some to be sown on the plots the following year and some to be distributed for co-operative experimental work throughout Ontario. A great deal of thought and care is required in planning, supervising and examining these plots, and in studying, comparing and summarizing the results for presentation in reports, bulletins, newspaper articles and lectures.

EXPERIMENTAL GROUNDS.

About fifty acres of land, divided into upwards of 2,000 plots, are used for experiments conducted with varieties of grain, root, tuber, grass, clover, fodder, silage and other crops; with artificial, green and farmyard manures; with methods of cultivation, selection of seed, dates of seeding, etc. All of these experiments are conducted with the greatest care, and for several years in succession in order to secure strictly accurate results. These experiments deal with the crops grown on over nine-tenths of the cultivated land in Ontario.

The grounds have a gentle slope towards the southwest, and the soil is an average clay loam. About one-quarter of the land is manured each year with twenty tons of farmyard manure per acre; thus most of the land receives an application of farmyard manure once every four years. No commercial fertilizers are used except in distinct fertilizer experiments, and these occupy only a small number of plots each year. Within the past nine years one green crop has been plowed under on each section of the field. The plots vary in size according to the requirements of the different experiments, and the yields per acre are determined from the actual yields of the plots in every instance.

RESULTS OF EXPERIMENTS.

All of our field experiments are conducted for at least five years before conclusions are drawn, and many of them continue for a much longer period of time. For the results of some of the tests which were carried on for five or more years previous to 1906, the reader is referred to former reports. The results of some of the experiments which have as yet been conducted for only one or two years, are withheld until the tests can be carried through for at least another summer. As different seasons vary so much in temperature, rainfall, etc., the average results of experiments continued for several years are of much greater value than those secured from only one or two years' work. Owing to the great care exercised in the work and the number of years through which the experiments are continued, we are able to present the results with much confidence in their reliability and in their practical value. From year to year the reports of the experimental work are being more widely read and more carefully studied by the farmers of the Province, and this is leading to a greater interest in crop production and a deeper knowledge of plant life on the farms of our country.

WEATHER CONDITIONS IN 1906.

A knowledge of the weather conditions during the growing season will be helpful towards a better understanding of the results of the experiments conducted. The report of the Physics department at the College shows that during the six months from April to September there was a rainfall of 17.5 inches. The precipitation for each of these months and for the same six months in each of six years previous to 1906, is shown in the following table:

Precipitation for past 7 years.		Precipitation in 1906.	
Year.	Rainfall during six months, April-September.	Month.	Rainfall.
1900..........	12.6 inches.	April.......	1.50 inches.
1901..........	16.5 “	May	2.71 “
1902..........	19.4 “	June	4.06 “
1903..........	15.8 “	July	4.65 “
1904..........	19.9 “	Aug........	2.13 “
1905..........	18.7 “	Sept	2.49 “
1906..........	17.5 “		

While these figures indicate that the precipitation for the six growing months in 1906 was only slightly more than average, it is worthy of notice that the rainfall during the months of June and July was very heavy.

The spring of 1906 did not open up unusually early, and no work was done on the land until about the middle of April, but after this date the weather was fine and the work of seeding was quickly accomplished. The first seed was sown on the experimental grounds on April 18th, and by the end of the month the greater part of the seeding had been done.

COMPARISON OF DIFFERENT CLASSES OF GRAIN CROPS.

From the report of the Provincial Bureau of Industries we learn that nearly 9,000,000 acres of land were used for the growing of field crops in Ontario in 1906. Bearing this fact in mind, we can easily perceive that slight mistakes in the selection of the most suitable crops for growing in the various localities, while they may not prove disastrous to the individual farmer, may easily result in great loss to the Province as a whole. Probably not enough thought has been given to this phase of the question of crop production among our farmers. The selection of crops is necessarily governed to a large extent by the location of the farm, the quality of the soil, the particular kind of farming which is followed, etc. There are many things to be taken into consideration in the selection of those crops which are likely to give the best satisfaction. Every farmer knows that oats will, as a rule, yield more bushels of grain per acre than will barley, and that barley, in turn, will yield more bushels per acre than wheat; but the bushel is a bulk measure and not a weight measure, and the weight of grain produced per acre is of much greater importance than the bulk. As there are more than 4,000,000 acres of the cultivated land in Ontario devoted to the growing of oats, barley, spring wheat, spring rye and peas, it is both interesting and valuable to make a study of the comparative yields of these crops, taking weight into consideration instead of bulk.

For the purpose of making such a comparison as that above referred to, an experiment has been in progress at the College for the past five years, and the results are presented in the following table. For this experiment the seeding took place on April 24th in 1902, on May 5th in 1903, on May 4th in 1904, on April 24th in 1905, and on April 24th in 1906. In each of these years twelve varieties of farm crops were grown in duplicate, making in all twenty-four plots in the experiment each season.

Varieties.	Date of ripening.	Height of plants.	Per cent-age of rust.	Straw per acre	Grain per acre.
		inchs.		tons.	lbs.
Barley (Mandscheuri)	Aug. 3	41	6	1.9	2739
Emmer (Common)	" 17	39	4	2.2	2714
Oats (Joanette)	" 13	39	8	2.8	2581
Hulless Barley (Black)	" 3	32	10	2.1	2546
Early Oats (Alaska)	" 6	42	11	2.2	2444
Hulless Barley (White)	" 6	34	5	2.0	2027
Spring Wheat (Wild Goose)	" 24	48	10	2.4	1818
Spring Rye (Common)	" 13	52	4	2.2	1775
Field Peas (Early Britain)	" 21	45	..	1.8	1684
Flax (Common)	" 15	28	..	2.1	1054
Grass Peas (Common)	Sept. 6	51	..	2.2	814
Spring Vetches (Common)	" 2	38	..	1.8	713

The figures presented in the foregoing table show that the greatest number of pounds of grain per acre has been produced by barley, and that the Emmer stands second in yield when weight is taken into consideration, and that there is but little difference between the yields of these two classes of grain; in fact the Emmer gave the highest yield for two out of five years through which the experiment has been continued. Emmer is, in reality, a species of spring wheat which is not yet very generally grown in Ontario, but gives promise of being a very useful crop when the grain is to be used for stock feeding purposes. The chaff of the Emmer is not removed in the process of threshing, as it adheres closely to the seed. In this respect it differs from the ordinary spring wheats. It may be well to state, however, that there is a larger percentage of hull on most varieties of oats than on Emmer. Oats have, as a rule, about 30 per cent. of hull, while Emmer has about 22 per cent., and barley 14 or 15 per cent. In comparing the different varieties of barley in this table, it should be borne in mind that while the yields of Black Hulless and White Hulless are considerably less than that of Mandscheuri, the grain of the hulless varieties weighs about sixty pounds per bushel, while the Mandscheuri will weigh from forty-eight to fifty. This difference, of course, is owing to the presence of the hull on the Mandscheuri variety. A close study of the table on the part of the reader will reveal several other interesting facts regarding the relative value of the different classes of grain.

One Year's Influence from Seed Selection.

For many years we have been conducting careful experiments to determine the value of careful selection of first-class seed for sowing. The results of these experiments have been given to the public from time to time, and in last year's report a summary of the results of all this work was presented. The experiments were not continued during the year 1906, but owing to the very great importance of this line of work it is deemed advisable to repeat here a considerable portion of the summary presented last year.

Fresh seed has been taken each year from the general crop of grain grown either on the Farm or in the Experimental department, or from seed of the leading varieties of roots and rape as obtained from some of the best seedsmen. It will therefore be understood that the results will represent simply one year's influence from seed selection; but in order to ascertain with greater accuracy the influence from one year's selection, the experiments have been repeated from season to season in order to secure a good average of soil and climatic conditions. For the large seed, none but well-developed grains were selected; for the medium-sized sample, the grains selected were of a uniform character, plump, and of medium size; and for the small, none but sound, plump and apparently good seeds of small size were used. In the selection of large, plump grain, one-half pound of each class was carefully weighed and counted. A corresponding number was then taken of the medium sized and of the small plump grains. The different selections of grain were sown upon plots of similar size.

Four tests were made annually with the different selections of seed of both root and rape crops. Duplicate experiments were conducted in which the seeds of the different selections were planted separately, and a duplicate experiment was also conducted by dibbling three large, five medium and eight small seeds at each place where it was desirable for a root or rape plant to grow. The plants were afterwards thinned, leaving one in each place, thus having the plants of the different selections of each class at equal distances apart. The results of the duplicate of each method were then averaged, and afterwards those of the two methods were averaged together. It will therefore be seen that the results of all the selections with roots and rape represent four distinct tests made in each of the years in which the experiment was conducted.

From the figures here presented in tabulated form, it is most interesting to observe the marked influence of one year's selection of seed on each of the eleven different crops here enumerated. It will be seen that the large seeds of oats produced about eight bushels per acre more than the medium sized, and the medium about seven and a half bushels per acre more than the small sized seed; or an advance of over fifteen bushels per acre from the large as compared with the small seed. Averaging the results for each class of crop, it is found that the large seed surpassed the small seed by 19.1 per cent. for the grain crops, 40.3 per cent. for the rape, and 60.1 per cent. for the root crops.

Crops.		Number of years of tests	Yield of crop per acre.		
			Large seed	Medium sized seed	Small seed
			Bus.	Bus.	Bus.
Grains......	Oats	7	62.0	54.1	46.6
	Barley	6	53.8	....	50.4
	Spring Wheat............	8	21.7	....	18.0
	Winter Wheat...........	6	46.9	....	40.4
	Field Peas........	6	28.1	....	23.0
			tons	tons	tons
Field Roots..	Mangels	5	33.2	29.6	21.5
	Sugar Beets..............	5	22.9	21.9	14.3
	Swede Turnips...........	5	17.1	15.2	8.7
	Fall Turnips.............	4	25.4	21.7	16.2
	Field Carrots............	5	24.5	22.2	16.2
Rape.......	Rape	5	17.4	15.0	12.4

In another experiment conducted in a similar way to the one just described, a comparison was made between plump and shrunken seeds of barley, spring wheat and winter wheat. In this case, none but either plump or shrunken seeds were selected, and the selections were made regardless of the size of the kernels. The same number of seeds of the different selections for each class of grain was taken, and the different lots were sown on plots of uniform size. The average of several years' results show that in weight of grain per measured bushel and yield of both straw and grain per acre, the large plump seed surpassed the shrunken seed in every instance for each of the grains here mentioned. In averaging all the results, it was found that the plump seed gave a yield of 20.2 per cent. more than the shrunken seed.

Unless care is exercised, a considerable amount of grain is frequently broken in the process of threshing. In order to ascertain the amount of injury done to the germination of the grain by means of its being broken at the time of threshing, experiments have been conducted for at least six years, by sowing both sound seed and broken seed of barley, winter wheat, and peas, and the results carefully recorded. The following gives the average yield of grain per acre of each selection of each class of crop: *Barley*:

sound seed, 53.8 bus., broken seed, 46 bus.; *Winter Wheat*: sound seed, 46.9 bus., broken seed, 9.3 bus.; and *Peas*: sound seed, 29.2 bus., broken seed, 10.2 bushels. As the barley nearly always breaks crosswise of the grain, the germ is usually left uninjured. In the case of winter wheat and peas, however, the grain usually breaks along the crease and in very many cases the germ is either totally or partially destroyed.

The Best Time to Sow Spring Grains.

In the past we have conducted experiments to determine the best time at which to sow oats, barley, spring wheat, and peas. The detailed results of this test may be found in previous reports. It may be stated here, however, that the results indicated clearly that the largest yields of spring wheat and barley were obtained by sowing as early as the land could be cultivated in the spring; that oats gave higher yields when sown a few days later, and that peas might, to advantage, be sown from one to two weeks later than the wheat and barley.

After several varieties of Emmer and Spelt had been given a thorough test on our experimental grounds for several years, and much valuable information had been gathered regarding these crops, it was thought wise that a test should be made by sowing these two classes of grain at different dates in the spring in order to obtain information similar to that previously gleaned with reference to the other spring grains. Accordingly, an experiment was commenced in the spring of 1903 by sowing both Emmer and Spelt on eight different dates; the first plot of each being sown as early as the land could be cultivated in the spring, and the others sown at intervals of one week. The average results of this test for the past four years are clearly set forth in the following table:

Dates of seeding	Lbs. per measured bushel		Tons of straw per acre		Lbs. of grain per acre	
	Spelt	Emmer	Spelt	Emmer	Spelt	Emmer
First	28.6	39.9	1.7	2.0	2395	2773
Second	27.2	39.1	1.6	2.1	2175	2827
Third	26.6	38.6	1.7	2.0	1956	2711
Fourth	25.1	37.8	1.7	2.2	1667	2787
Fifth	24.	37.1	1.6	2.3	1413	2701
Sixth	21.5	36.3	1.8	2.5	1020	2615
Seventh	20.3	35.6	1.6	2.6	753	2548
Eighth	21.4	33.9	1.7	2.0	544	2113

Probably the first observation the reader will make on looking over this table will be the larger yield of the Emmer in every case. This superiority of Emmer over Spelt is also clearly shown in the results of our variety test and need not be given any further attention here. It will next be noticed that the second seeding of Emmer produced a larger crop than any of the others, while the highest yield of Spelt was obtained from the first seeding in the average of the four years' results. It should be further stated here that the largest yields of Emmer were obtained from the fifth sowing in 1903, the sixth sowing in 1904, the seventh sowing in 1905, and the first sowing in 1906; while the highest yields of Spelt were obtained from the first seeding each year. The most important observation to be made in connection with this test is that there is but little difference between the yields from the first seven seedings of Emmer, and that this crop yields well even when sown quite late in the season; while it is plainly evident that Spelt must be sown as early as possible in the spring in order to get the best results. This is a very important factor in connection with the growing of Emmer, since, in a season when seeding of the ordinary spring grains may have been delayed through inclemency of the weather or the growth retarded after seeding owing to low temperature or other unsuitable conditions, it would likely be found much more profitable to sow Emmer than any of the other classes of spring grain, providing the crop was to be used for stock feeding purposes.

QUANTITY OF SEED PER ACRE.

For the results of experiments conducted in this Department in sowing different quantities of seed per acre of the various classes of spring grain and of winter wheat, the reader is referred to reports of past years.

In 1905, and again in 1906, each of four varieties of flax were sown at the rate of one-quarter, one-half and three-quarters of a bushel, and also at the rate of two, three and four bushels per acre, making in all twenty-four plots in the experiment each year. Averaging the results of the four varieties sown with each of the quantities of seed per acre here indicated, we find that the yields of flax per acre, after the seed used was subtracted from the crop, produced as follows:

Amount of seed sown per acre	Average yield per acre (2 years)	
	Tons of straw	Bushels of seed
1 peck	1.4	15.9
2 pecks	1.9	18.8
3 pecks	2.2	19.0
2 bushels	2.7	19.2
3 bushels	2.7	16.9
4 bushels	2.7	13.1

It will therefore be seen that the greatest yield of flax seed, less the amount of seed used, was obtained by sowing two bushels of seed per acre.

It is generally understood that when seed production is the only object in view, a much thinner seeding is desirable than when the crop is intended for the production of fibre; therefore, when this experiment was commenced it was expected that the first three seedings enumerated in the above table would indicate the best quantity of seed to be sown per acre for the production of seed, and that the last three seedings would give similar information regarding the sowing of flax for fibre production . Up to the present time, however, the results of the experiment show that two bushels of seed per acre will give a larger yield of seed than any of the thinner sowings. When flax is sown quite thickly the stems grow slender and upright and do not branch, with the result that a much longer and better quality of fibre is produced than when thinner sowing is resorted to. In each of the past two years there has been a decided difference in the production of the different varieties of flax, as will be shown in a later part of this report.

GROWING MIXED GRAIN FOR FEEDING PURPOSES.

For many years the desirability of growing grains in mixtures for the production of grain for feeding to live-stock has been a live topic at Institute meetings and other gatherings of farmers, some maintaining that larger yields were obtained when the grains were grown separately, according to the old method, and others holding that it was profitable to sow mixtures.

Experimental work along this line was commenced by our department some time ago, and for five years in succession an experiment was conducted in growing oats, barley, wheat, and peas separately; and in eleven different combinations, having two, three or four classes of grain in each mixture. The results showed that the grain which was sown in mixtures produced larger yields per acre than the same kinds of grain sown separately in most cases. Of the eleven distinct mixtures used, the combination of oats and barley gave the heaviest average yield of threshed grain per acre. This mixture also gave a larger yield than any of the grains grown separately, and a considerably larger yield than the average of the oats and barley grown separately.

When this experiment had been completed, a new test was commenced, in order to determine the best proportions of oats and barley to sow per acre in order to obtain the greatest yield. This experiment was continued for six years and many different proportions were used. The average results at the end of the six year period showed that the largest yield had been obtained from sowing a mixture of one bushel of oats and one bushel of barley per acre.

For five years in succession an experiment has been conducted to determine whether a mixture of oats and barley could be improved upon by adding a quantity of some other kind of seed. This test has been made in duplicate each year, and the standard mixture used contained one bushel of oats and one and one-half bushels of barley per acre. Five plots were used for each individual test. On the first plot, oats and barley only were sown, and on each of the others half a bushel of some other kind of seed was added to the oats and barley mixture. The following table gives the average results in yield per acre of the two tests for each of the five years:

Mixtures	Tons of straw	Lbs. of grain
Oats (34 lbs.) Barley (72 lbs.)	2.2	2,612
Oats (34 lbs.) Barley (72 lbs.) Flax (28 lbs.)	2.4	2,566
Oats (34 lbs.) Barley (72 lbs.) Emmer (22 lbs.)	2.2	2,545
Oats (34 lbs.) Barley (72 lbs.) Spring Wheat (30 lbs.)	2.2	2,512
Oats (34 lbs.) Barley (72 lbs.) Hulless Barley (30 lbs.)	2.2	2,457

The figures shown in this table indicate very clearly the difficulty of surpassing a mixture of oats and barley for grain production.

Varieties of Barley and Oats Most Suitable for Growing.—When barley and oats are grown in combination, it is, of course, necessary to use varieties which will mature at about the same time in order that they may be harvested to best advantage. For this purpose, a very early variety of oats should be used with the common six-rowed varieties of barley, and it will be necessary to use a very late variety of barley with the ordinary heavy yielding varieties of oats. For an early ripening crop, we have found that Daubeney oats and Mandscheuri barley make an excellent combination, but where it is desirable to use such oats as the Siberian or Banner, the later two-rowed barleys, such as Chevalier or Canadian Two-Rowed, should be used in the mixture. Our experience, and the experience of other experimenters in different parts of the Province, goes to show that the mixture of Daubeney oats and Mandscheuri barley gives a larger yield of grain than a combination of later maturing varieties.

Twelve Kinds of Grain Grown in Combination.—In the spring of 1902, an experiment was started in growing twelve kinds of grain in different combinations. One of the principal objects of this experiment was to ascertain the relative value of different kinds of grain in a mixture, in comparison with the same grains when grown separately. Another object was to learn which of the twelve kinds would give the greatest percentage of both straw and grain in the crop produced. The mixtures were made up in two different ways, first, by using the same amount of seed of each variety as is usually sown when the grains are grown separately, and second, by using equal quantities of seed of all the varieties. Each of the mixtures here described was sown at the rate of 112 pounds of seed per acre. Both parts of the experiment were conducted in duplicate each year and the results of the five years' tests are presented in the following table:

Varieties used in each mixture.	Percentage of grains in mixtures. Five years—twenty tests.		
	Uniform weights of seed sown.	Quantities of seed in same proportion as when grown separately.	Average of two classes of mixtures.
Six-rowed Barley (Mandscheuri)	18.0	16.9	17.4
Hulless Barley (Black)	13.1	14.9	14.0
Spring Rye (Common)	12.8	13.8	13.3
Early White Oats (Alaska)	12.9	9.3	11.1
Black Oats (Joanette)	11.7	8.3	10.0
Emmer (Common)	6.2	7.2	6.7
Hulless Barley (White)	6.0	7.1	6.6
Peas (Field)	4.5	8.1	6.3
Grass Peas	6.1	5.1	5.6
Spring Wheat (Wild Goose)	4.2	5.6	4.9
Vetches (Common)	2.8	2.3	2.6
Flax (Common)	1.8	1.4	1.6

The figures shown in the above table indicate very clearly the comparative value of the different classes of crops for growing in mixtures. It will be seen at once that there is a somewhat higher percentage of six-rowed barley in the product of both mixtures than of any of the other grains, and that both oats and barley stand near the top of the list. These results, therefore, go to confirm the results of other experiments, and show that it is difficult to make a mixture which will produce a heavier yield of grain per acre than one made by a combination of barley and oats. It will also be seen from this table that Emmer produced but a small percentage of the mixture in either case, showing, that while it is a heavy yielding grain when sown alone, it is not so well suited for growing in combination with other crops.

PLANT BREEDING.

Improvement by Selection.—The improvement of grain crops by plant breeding, has been conducted on an enlarged scale during the past summer. Over 31,000 single plants of the leading varieties of spring and winter grains have been grown and studied individually. Besides these, 110 test-plots of the selected strains of grains have been grown and studied. Since the spring of 1903, systematic selection of seed from known individual parentage has been carried on. At this time some very choice grain of six varieties of oats, barley and spring wheat were selected from the crops grown in the Experimental department of 1902. Of each of these six varieties, one-sixteenth of an acre was sown with a grain drill in the ordinary way; one-sixteenth of an acre was sown with a grain drill by using every second tube of the drill; one-sixteenth of an acre was planted by hand, placing the seeds eight inches apart each way; and one-sixteenth of an acre was planted by hand, placing the seeds one foot apart each way. It will therefore be seen that one and one-half acres were devoted to this work in 1903. No less than 9,972 seeds of each variety, or a total of 59,832 seeds of the six varieties, were planted by hand. The four methods of planting were used in order that a comparison might be made as to the best method to use in plant selection. It was found that the grain which was sown with a grain drill, either from every tube or from every second tube, gave a very poor opportunity for plant selection. From grain sown with a drill, heads may be selected, but it is practically impossible to make a satisfactory selection of plants, owing, largely, to the uneven distribution of the seed. When plants are grown at unequal distances apart, they vary greatly, owing to the relative amounts of soil, moisture and air furnished the individual plants, by the uneven way in which the seeds were distributed in the soil. On a careful examination of the plants obtained from the drilled seed, it was found that some of them would be separated from all other plants by ten or twelve inches; while in other cases two or three plants would be growing so closely together that their roots and stems would become so much entangled that it was difficult to ascertain whether there was simply one plant or whether there were two or three or four plants, until a considerable amount of time and labor were expended in making the examination. It was therefore decided to make a few selections of heads, but not to make a selection of plants from the crop produced from the seed sown with the machine. The grains which were sown by hand, however, gave an excellent opportunity for the plants to grow under uniform conditions. As all the plants in each of the two methods of hand planting were at equal distances apart, it afforded a good opportunity for studying the stooling properties, the comparative strength of straw, the size and uniformity of the heads, etc., of the individual plants. When the crops of each variety on the hand-planted plots had reached the proper stage of maturity, careful examinations were made and the results recorded for reference. After this was done, a few of the very best plants were selected and harvested separately. All of the seed of the most promising plant of each variety was sown in 1904, and nearly all the grain produced in 1904 was sown in the spring of 1905. Careful notes of the yields and characteristics of the several plants and plots of grain were taken, and certain constant amounts of seed were chosen from the products of the most satisfactory plots, and planted on plots of uniform size for the tests of these strains in 1906. In 1903, beside the selections cited above, a number of other choice plants of each variety were selected, and harvested separately; and afterwards the best seed was selected and sown in single rows during the summer of 1904. From those strains which gave the best satisfaction in 1904, a sufficient amount of seed was selected and sown on uniform plots in the spring of 1905, and the yield and quality of the crop produced were carefully noted. In the spring of 1906, selections were again made from the best of these strains, and grown and studied as in 1905. The results obtained furnished some very interesting and valuable information. The great value to be got from continuous and systematic selection is evident. In the selection of seed of winter wheat, considerable importance is attached to strength of straw and power to resist disease. Just as in the animal kingdom, if the parent has not a rugged constitution it cannot withstand the severity of the climate, so a weak parent plant cannot withstand the rigors of climate and force of storms, nor can it produce offspring strong in constitution. Hence, to get a winter wheat that will produce the largest amount of plumpest grain, we must select parent plants showing strength of constitution—strength of straw. Ontario wheat has suffered greatly from the attacks of red rust (*Puccina graminis*). Certain strains of wheat seemed to be attacked less than were their neighbors. This desirable quality to resist disease was given prominence in selecting certain strains of winter wheat, and although the work is comparatively new there are indications of the transmission of this desirable quality and of other desirable qualities in the generations of recorded strains. We hope to further increase the power of winter wheat to resist rust, by breeding up strains of wheat that are immune to its attacks.

General Results of Selection.—The crop of 1905 produced sufficient grain of many of the strains of winter wheat, spring wheat, and other spring grains to supply seed for a plot of each strain in the variety test, *i.e.*, the improved strains of wheat, barley, oats, etc., were tested alongside of other varieties of these grains. In many cases the selected strains of grain excelled the ordinary variety crop in yield and weight per measured bushel. However, in some cases, the selected strains proved themselves inferior to the ordinary variety from which they had been selected. The tests of these selected strains will be carried on for five years, as are the tests of new varieties of grain. Those strains that prove themselves superior to the ordinary variety will be retained permanently, while the inferior strains will be discarded. The improvements of the varieties of grains by selecting their superior strains, seem to offer great opportunities. The results of the work of this Department are very encouraging.

Improvement by Hybridization and Selection.—The work of improving cereal crops by artificial cross fertilization followed by selection promises to become one of the great avenues for the betterment of such crops. By proceeding, according to the laws of nature, the plant breeder is able to combine two varieties of grain, each of which contains desirable and undesirable qualities. This must be followed by careful and wise selection of new types that arise in successive generations so as to obtain a combination of the good qualities of the parent varieties, while eliminating the undesirable qualities. A close study of the investigations of de Vries, Bateson, Biffen, Hays, and others, along with the theory of heredity enunciated by Mendel, is throwing considerable light on these difficult problems. A very close study of the development of hybrids grown at this station is being made, and valuable data is being collected. During the summer of 1906, over 15,000 hybrids of winter and spring grains were grown. In 1903, a cross was made between Dawson's Golden Chaff and Turkey Red varieties of winter wheat with the purpose of combining the hardness or flintiness of grain of the Turkey Red variety with the many good qualities of the Dawson's Golden Chaff wheat. In the summer of 1905, the product of this cross showed many variations. Four desirable types of plants were chosen from among these variations, and a number of seeds of plants conforming to these types were sown in 1906. When the crop of 1906 matured, it was found that two of the desirable forms of this cross came true to type. Several plots of the new breed were consequently planted this fall, and will be watched with great interest through the season of 1907. In spring grains, a promising hybrid was obtained by crossing Emmer on Spelt. The troublesome beards of the Emmer have been removed, and the head lengthened considerably. The new type has come true through two generations. Still another hybrid has been obtained by crossing Red Fife on Herison Bearded spring wheat. A valuable cross between Joanette and Siberian oats has been made. The hybrid combines the thinness of hull of the Joanette oats with the strength of straw of the Siberian oats. These new breeds of grain must be tested for some years to make sure of their constancy in transmitting their characteristics. We hope, as we gain more light on this problem, by close observation of the growing plants, and by studying the works of other plant breeders, to reduce the time necessary for producing a new breed to a minimum. The work of the past season has been full of promise, and, although problems have arisen that we little anticipated, certain definite indications of progress are plainly visible. We aim at producing varieties of cereals that will be adapted to the different soils and climates of our Province, and that will give the heaviest yields where grown.

Treatment of Grain for Smut.

The farmers of Ontario are sustaining much loss from year to year through the injury done to the barley, wheat, and oat crops by smut. As this loss can be prevented to a large extent by the proper application of certain treatments to the grain before sowing, it would be well for the reader to study carefully the results of our experiments along this line.

Two varieties of winter wheat and two varieties of oats have each been treated in seven different ways, so that the results of the different treatments might be compared with one another, and with the results of sowing seed which was left untreated. The various treatments were as follows:

(1) Immersion in Diluted Formalin. The solution of formalin used for the immersion process was made by pouring one-half pint of the formalin into 21 gallons of water, and the seed oats were immersed in the solution for twenty minutes.

(2) Sprinkling with Diluted Formalin. One-half pint of formalin was poured into 5 gallons of water. The oats were then sprinkled with this solution and carefully stirred until the grain was thoroughly moistened.

(3) Immersion in Hot Water. For this treatment, the grain was placed in a bag, which was then immersed in water at about 115 degrees F. Soon afterwards it was placed in water which was kept at a temperature of between 130 degrees and 135 degrees F. The grain was occasionally stirred, and was allowed to remain in the water for a period of fifteen minutes. It was then spread out on a clean floor to dry, where it was stirred occasionally.

(4) Immersion in Bluestone Solution for Twelve Hours. In this treatment, the bluestone solution was made by dissolving one pound of bluestone in 25 gallons of water, and the oats were immersed in this solution for a period of twelve hours.

(5) Immersion in Bluestone Solution for Five Minutes. For this treatment, a strong solution was made by dissolving one pound of Copper Sulphate (Bluestone) in one gallon of water, and then immersing the oats in the solution for a period of five minutes.

(6) Immersion in Potassium Sulphide Solution. The potassium sulphide treatment consisted in soaking the seed for two hours in a solution made by dissolving eight pounds of potassium sulphide in 50 gallons of water.

(7) Sprinkling with Bluestone Solution. This solution was made by dissolving one pound of bluestone in 10 gallons of water, which was used for sprinkling over the oats until they were thoroughly moistened after being carefully stirred.

(8) Untreated. One sample of oats of each variety was left untreated in order that the influence of the various treatments might be observed.

It will be seen that eight lots of each variety of winter wheat and also of oats were used in the experiment each year. A few hours after the treatments had been completed, the grains were carfully sown on separate plots of uniform size. When the winter wheat was about ready to cut, the plots were carefully examined and the smutted heads picked out and shelled. The rest of the crop was then cut and threshed and again carefully examined for smut balls. After the oats began to head out, they were examined frequently, and all smutted heads were removed and carefully counted. The following table gives the results in the percentage of smutted grains of winter wheat and of smutted heads of oats:

Treatment.	Winter Wheat.	Oats.
	Per cent. of Smut in Crop, Average of 3 years.	Per cent. of Smut in Crop, Average of 5 years.
Immersion in Diluted Formalin	.0	.0
Sprinkling with Diluted Formalin	.0	.0
Immersion in Hot Water	.0	.0
Immersion in Bluestone Solution for twelve hours	.0	.1
Immersion in Bluestone Solution for five minutes	....	.8
Immersion in Potassium Sulphide Solution	....	1.2
Sprinkling with Bluestone Solution	.1	1.3
Untreated	4.5	5.7

It will be seen from the foregoing table that the experiment has now been continued for three years with winter wheat and for five years with oats. The column representing the results of the winter wheat shows that most of the treatments were quite effectual in preventing the development of smut, but it must be borne in mind that this refers only to the hard or stinking smut and not to the loose smut of wheat, these treatments not being useful for the prevention of the latter. Several treatments have also been quite successful in preventing the development of smut in oats, but some of them have proven to be more or less injurious to the seed to which they were applied, and are therefore not desirable. In the average results, it will be seen that there was quite a large percentage of smutted grain in both the oats and wheat which were not treated. Such a percentage of smut in all the wheat and oat fields of the Province would mean a great loss in the total production. The grain which was immersed for twenty minutes in a solution made by adding one pint of formalin to 42 gallons of water produced a crop which was practically free from smut in the case of both winter wheat and oats in each of the years when the experiment was conducted. The treatment here mentioned was easily applied, comparatively cheap, effectual in killing the smut spores, and was found to be less injurious to the seed grain than any of the other treatments.

In each of the last three years, an experiment has been conducted with two varieties of oats; the seed of each was one, two, three, four, and five years old. The object of the experiment was to ascertain whether smut spores would lose their vitality sooner than the oats. Up to the present time we have not found this to be the case, since the seed five years of age has produced quite as many smutted heads as the seed grown last year.

For two years in succession we have endeavoured to prevent the development of smut in barley by immersing the seed in a solution made by mixing one pint of formalin with 42 gallons of water. This experiment was conducted with two varieties of barley each year, but the treatment has not proven effectual in any case. It would seem, therefore, that while this solution completely destroys oat smut, it is of no value for the prevention of smut in barley.

VARIETIES OF OATS.

The acreage devoted to the growing of oats in the Province of Ontario is increasing from year to year. In the year 1906, there were in Ontario about 48,000 acres more of oats than in 1905. This increase, and the fact that the oat crop is already very much more important than any other class of grain grown in this Province, will warrant all possible efforts being made to increase the yield per acre by whatever means this may be accomplished. Better preparation of the soil for the seed, greater care in the handling of the crop, and the selection of the very finest varieties for growing in all parts of the country, will all help to swell the yield per acre, and hence the total production. An increase of even one or two bushels per acre would mean an immense increase in money value to the Province as a whole. Careful inquiry has revealed the fact that the Siberian and Banner varieties are decidedly the most extensively grown oats in Ontario at the present time. The Siberian was imported from Russia by this department many years ago, and after having been thoroughly tested and its high value ascertained on our experimental grounds, it was widely distributed through the Province, and unquestionably the introduction of this variety has been largely instrumental in increasing the average yield per acre throughout Ontario.

Within the past eighteen years, 287 varieties of oats have been tested in the Experimental department at the College. Many of these have proven comparatively worthless for growing in Ontario, but a large number of them are very good varieties, and some are decidedly superior in yield and in quality to many of the kinds commonly grown throughout the Province. The results of these variety tests have been given to the public from time to time, and it is not thought wise to place them in tabulated form in this report. It may be stated, however, that among 53 varieties which have been grown for the last five years, 15 have given average yields of more than 100 bushels per acre in our plot tests, the Banner standing first, with a yield of 109 bushels per acre. Among the early varieties the Daubeney is possibly the most promising in yield and quality. Other good early varieties are Prosperity, Alaska, and Early White Pearl. The Early Ripe is one of the very earliest to mature, and although rather a poor yielder, seems to be less subject to injury from smut than any of the other varieties.

VARIETIES OF BARLEY.

Our varieties of cultivated barley are naturally divided into two great classes, six-rowed and two-rowed. Each of these is divided into several subclasses, and in each sub-class we find a number of varieties.

Six-Rowed Barley.—Most of the varieties of barley grown on the farms of Ontario, belong to the six-rowed class, and these will be spoken of most fully in this report. During the last twenty years quite a number of sorts have been tested on our experimental grounds. From time to time inferior kinds have been discarded, and each year new varieties have been added to the list. Four of the standard varieties have now been tested for seventeen years in succession, and the average yield per acre of these four for the seventeen years is, as follows: Mandscheuri, 70.6 bushels; Oderbrucker, 64.2 bushels; Common Six-rowed, 61.9 bushels; and Mensury, 60.2 bushels. These figures show that the Mandscheuri variety is quite decidedly superior to the others in yield and quality, and it is fortunate that this is at the present time probably the most widely grown barley in Ontario. In order to make a comparison of a larger number of varieties for a shorter period of time, the following table is introduced:

Varieties.	Average results for 5 years.		
	Pounds per Bushel.	Tons of Straw per Acre.	Bushels of Grain per Acre.
California Brewing	46.1	2.3	79.5
Mandscheuri	50.5	2.6	77.8
Oderbrucker	51.3	2.3	71.6
Triumph	51.6	2.2	71.2
Common six-rowed	52.3	2.2	70.1
Scotch Improved	52.6	2.3	68.6
Mensury	52.2	2.3	63.9
Imperial six-rowed	52.1	2.1	63.0
Success	48.9	1.8	53.1
Dakota Silver Beardless	47.9	2.0	50.4
Champion Beardless	48.5	1.7	49.8
Humboldt	48.8	1.7	49.2
Ohio Beardless	47.6	2.0	48.2

From this table it will be seen that the California Brewing has given a somewhat larger yield than the Mandscheuri in the average of the last five years; but the reader will observe that while this is the case, the quality of the first mentioned variety is not nearly so good as that of several of the more commonly grown kinds, the weight per measured bushel being only slightly more than 46 pounds, while other varieties weigh from 50 to 52.6 pounds per bushel. The California Brewing is rather weak in the straw and has a very strong, harsh beard. These qualities, combined with the light weight of the grain, make it rather undesirable, even though the yield is large.

The first eight varieties mentioned in the above table are bearded and the other five beardless. It is interesting to note that the beardless varieties (while they are not nearly so disagreeable to harvest and thresh) give much lower yields of grain than the others; and the grain is decidedly light in weight, as compared with all the bearded kinds excepting California Brewing.

Two-Rowed Barley.—Sixteen varieties of two-rowed barley have been tested for the past five years in succession. Five of the best of these have given the following average yields: Iowa No. 5590, 72.3 bushels; Iowa No. 5591, 71.2 bushels; Jarman's Selected, 71.2 bushels; Two-rowed Canadian, 70 bushels; Selected Canadian Thorpe, 68.5 bushels. There are two very distinct classes of two-rowed barley. All of the varieties belonging to the first class have very strong straw and rather short upright heads, while those belonging to the second class produce very weak straw and long, slender nodding heads. Varieties of both of these classes produce plumper and more uniform grain than that furnished by the six-rowed varieties. The grain furnished by the weak strawed, slender headed two-rowed kinds, is considered much better for malting purposes, owing to its high starch content; but in Ontario the varieties belonging to the strong strawed, upright class, produce considerably larger yields, and will therefore probably be more widely grown than the others. The Two-rowed Canadian is one of the best known varieties of the last mentioned class, and all of the two-rowed varieties named in this paragraph belong to the same class.

Hulless Barley.—Eight varieties of hulless barley have been given a careful test for the past five years. Among these the Guy Mayle stands first in average yield, with 53.2 bushels per acre; the Hungarian second, with 50.3 bushels; and the Black Hulless third, with 49.1 bushels. It must, of course, be borne in mind that the above yields are reckoned at the rate of 60 pounds per bushel, since that is about the usual weight of the grain of this class of barley.

Winter Barley.—A few strains of winter barley have been tested at the College for quite a number of years, and it has been found that while these do not always survive the winter, still in seasons when they are not winter killed they produce large yields of about the same quality of grain as that furnished by the ordinary six-rowed varieties. In nine out of the past fourteen years these varieties have come through the winter fairly well and have generally given good crops. In the other five years, the crop was almost completely winter killed.

VARIETIES OF WHEAT.

There are in all, seven distinct species of wheat, and to one or another of these species all our cultivated varieties belong. The species may be enumerated as follows:

(1) Common, soft, or flour wheat (Triticum vulgare).
(2) Turgid or Toulard wheat (Triticum turgidum).
(3) Hard, or flinty wheat (Triticum durum).
(4) Polish wheat (Triticum polonicum).
(5) Spelt (Triticum spelta).
(6) Emmer (Triticum dicoccum).
(7) One-grained wheat or Einkorn (Triticum monococcum).

All of the winter wheats and the majority of the spring varieties belong to the first class and are used chiefly for the manufacture of flour.

Winter Wheat for Flour Production.—About two hundred and fifty varieties of winter wheat have been tested at the College within the last seventeen years. In all cases the varieties are given a thorough test for five years, at the end of which time the inferior kinds are discarded and only the more promising ones retained for further experiments. During the past season sixty-one varieties were grown; twenty-nine of these have been under test for the past five years, and fifteen of the twenty-nine for the past ten years.

The following table gives the average weight per measured bushel and the average yield of straw and grain of each variety for ten years.

Varieties.	Color of Grain	Weight per Bush.	Straw per Acre.	Grain per Acre.
		lbs.	tons.	bus.
Dawson's Golden Chaff............	White	59.7	3.3	54.0
Imperial Amber..................	Red	60.5	3.8	52.3
Early Genesee Giant..............	White	59.7	3.5	50.7
Russian Amber...................	Red	60.7	3.6	50.4
Egyptian Amber..................	Red	61.2	3.7	49.6
Early Red Clawson...............	Red	58.9	3.2	49.5
Tasmania Red....................	Red	61.5	3.3	47.7
Rudy...........................	Red	60.8	3.0	47.1
Tuscan Island...................	Red	61.0	3.3	47.0
Geneva.........................	Red	62.2	3.3	45.9
Bulgarian	White	60.5	2.9	45.1
Turkey Red......................	Red	61.1	2.9	44.8
Kentucky Giant..................	Red	61.0	3.0	44.6
McPherson.......................	Red	62.0	2.9	44.2
Treadwell.......................	White	60.4	2.9	44.2

Among the sixty-one varieties grown this season, the Abundance stood first in yield with 50.4 bushels per acre, and the Prize Taker second with 50.2 bushels. These are both white wheats, very closely resembling the Dawson's Golden Chaff in all respects. The Abundance also gave the highest yield among all the varieties grown in 1905 and is a promising variety, although not of the very best milling quality. It is interesting to note that this year two of the comparatively hard red wheats—Russian Amber and Imperial Amber—have come up to second and third places in yield of grain with 49.8 and 49.4 bushels per acre respectively. All four varieties mentioned above were over the standard in weight, the Imperial Amber being the heaviest and weighing almost 63 lbs. per bushel. The five varieties giving the heaviest weight per measured bushel in 1906 were Northwester, Geneva, McPherson, Economy, and Auburn; these, however, were all rather low in yield with the exception of Auburn, which was fifth in weight per measured bushel and sixth in yield of grain per acre among the sixty-one varieties grown. Generally speaking, the white wheats yield more grain per acre, possess stronger straw, weigh a little less per measured bushel, and are slightly softer in the grain than the red varieties.

Spring Wheat for Flour Production.—The area devoted to the growing of spring wheat for the manufacture of flour is decreasing from year to year in this Province. This is owing to the fact that winter wheat can be grown with greater profit in most localities; and spring wheat of better quality than can be grown in Ontario is being imported from the Canadian West in larger quantities each succeeding year. Thirty-five varieties of spring wheat were grown in the Experimental department in 1906. Twenty of these have been grown for five years in succession, and eleven of the twenty belong to the class of wheats used for the production of flour. Among these, the well-known Red Fife variety stands first in average yield with 33.5 bushel per acre; the Pringle's Champion second with 33.1 bushels, and the Saxonka third with 33 bushels per acre. Thus it would seem that we have no new variety of spring wheat to offer the public which will give better satisfaction than the Red Fife, which has been grown for so many years both in Ontario and in the Canadian West.

Spring Wheat for the Production of Macaroni.—The varieties of wheat used for the manufacture of macaroni belong to the third species mentioned in the foregoing list. Seven varieties of this class were grown in the Experimental Department at the College in 1906, and six out of the seven have been grown for the past fourteen years. On averaging the yields for the fourteen years, we find that the Wild Goose variety stands first with 39.7 bushels; Medeah second with 35.4 bushels; and Bart Tremenia third with 34.8 bushels. On looking over the results of the experiments for each of the years included in this test, we find that the Wild Goose gave the highest yield ten times out of the fourteen. Thus we see that it is an outstanding variety among the macaroni wheats. It should be said, however, that while this variety gives a much larger yield of grain than any of the flour producing wheats, it seldom brings as high a price on the market, and in fact is most commonly used for feeding purposes or for shipment to countries where macaroni is manufactured.

Spring Wheat for Feeding Purposes.—In this class, we place the varieties of Emmer and Spelt. These are generally used for the making of meal for stock feeding purposes, owing to the fact that the chaff adheres closely to the grain and is not removed in the process of threshing. The following table includes three varieties of Emmer and four of Spelt which have been tested for the past five years, and the average results are given in all cases:

Classes of Crop	Varieties	Percentage of			Pounds per bushel 4 years	Yield per acre	
		Rust	Crop lodg'd	Hull with grain		Tons of straw	Pounds of grain
Emmer	Common......	3	29	21	39.0	2.4	3264
	Iowa..........	2	27	21	39.6	2.2	3107
	Russian	2	29	22	39.9	2.2	3057
Spelt..................	Red	14	4	31	27.5	2.0	2464
	Alstroum......	20	4	31	27.6	2.0	2432
	White	15	3	32	27.8	1.7	2139
	Dasyanthum ..	17	16	30	27.4	1.9	1904

The decided superiority of Emmer as a grain producer is very clearly shown by the figures given in the above table. For the five years through which this test has been carried, Common Emmer has given an average of 800 pounds of grain per acre more than the highest yielding variety of Spelt. Not only is the superior yielding power of the Emmer here shown, but the better quality of the grain is also evident, since there is a much lower percentage of hull on the Emmer than on the Spelt. A study of the table will reveal some other interesting facts regarding the comparative value of these two classes of grain and also the relative merits of the different varieties of each.

Polish Wheat or Corn Wheat.—This grain has been sold under both names, but most commonly under the name of Corn Wheat in Ontario. It has been under test on our plots for about twelve years, and was grown again in 1906 in comparison with the other varieties of both flour and macaroni wheats, and this year, as before, has shown itself to be a poor producer of grain.

VARIETIES OF RYE.

The acreage devoted to the growing of rye in Ontario is greatly decreasing, and yet there were nearly 80,000 acres of this crop grown in 1906. It is therefore worthy of brief mention in this report.

Spring Rye.—Four varieties of spring rye have been under test for the past five years and have given the following average yields of grain per acre: Dakota Mammoth, 32.8; Common, 31.7; Prolific, 31.3; and Saatroggen, 20.1. The Saatroggen was introduced from Germany five years ago, and for the first two years that it was grown produced very little grain, but since it has become acclimatized it is giving very much better results and surpassed the Dakota Mammoth in yield of grain per acre both in 1905 and 1906. It would therefore seem to be a very promising variety, and may prove to be of much value to farmers interested in the growth of this crop.

Winter Rye.—Common Winter Rye and Mammoth Winter Rye have been grown for seven years in succession; the Common giving an average yield of 57.9 bushels and the Mammoth 59.3 bushels of grain per acre. Among five varieties grown for the past three years, the Mammoth White stood first with an average yield of 66.6 and the Washington second with 61.7 bushels per acre.

Winter Barley.—Winter Barley has been grown at the College for several years, and when it is not winter killed gives very good yields. This season it made a very poor showing in the spring, but recovered from the effects of the unfavorable winter and yielded 58.5 bushels per acre.

Hairy or Winter Vetches.—Hairy or Winter Vetches produced an average yield of 10.2 tons of green crop per acre in the experiments for four years and 6.7 bushels of seed per acre in the tests for six years. Home grown seed has given considerably better results than imported seed.

VARIETIES OF BUCKWHEAT.

Of the five varieties of buckwheat which were grown on our grounds in 1906, three have been under test for nine years in succession, the Silver Hull giving an average yield of 20.4 bushels; the Japanese, 19.9 bushels; and the Common Grey, 17.2 bushels per acre. The variety known as Rye Buckwheat, which was introduced three years ago, has given higher yields of grain than any of the other kinds grown in each of the past three years.

VARIETIES OF FIELD BEANS.

There were in all, sixteen varieties of field beans under test in the department during the past season, and most of these gave very fair yields of grain. Thirteen of the number have now been grown for ten successive years, the Pearce's Improved Tree producing an average annual yield of 25 bushels of grain per acre; the Burlingame Medium, 21.6 bushels; the Day's Improved Leafless, 21.3 bushels; the White Wonder, 21.3 bushels; and the Medium or Navy, 21.2 bushels. Among these five varieties there is a difference of about seven days in time of maturing, the Burlingame Medium being the earliest and the Pearce's Improved Tree the latest of the five. Of the new varieties which have been tested for only a few years, the New Prize Winner and Yellow Eyed Marrowfat give promise of being very profitable kinds to grow.

VARIETIES OF SOY, SOJA OR JAPANESE BEANS.

Although a large number of varieties of this class of beans have been tested for some years on our trial grounds, most of them prove to be quite unsuited for growing in Ontario as they require a long season in which to mature. A few varieties, however, ripen quite early and produce good yields of grain, which is very high in feeding value. Among the varieties which mature their seed here, the Early Yellow is worthy of special mention. In 1906, this variety gave a yield of 30.4 bushels of ripe seed per acre, this being the greatest amount of grain produced by it in any one year since 1893, when it was first tested. Its average yield for the eleven years is 16 bushels per acre. Other varieties which have made good growth in our tests are the Medium Green and Ito San. The plants of the Medium Green are considerably taller and require a longer season to reach maturity than those of the other two varieties mentioned, and it is probable that this kind will be used for fodder and ensilage purposes rather than for the production of seed.

Cow Peas.

While the varieties of cow peas which have been under test for several years have generally made but a poor growth, in 1906 all of the ten kinds grown germinated well and grew vigorously throughout the season. The cow pea is, of course, a southern crop, requiring, as a rule, a much longer season than we have in Ontario. In most years they have been in about the blossoming stage at the time that the first autumn frosts came, but in 1906 most varieties produced pods and a few gave small yields of ripened seeds. Among these might be mentioned Salzer's Prolific, Sixty Day, and Ivon. While it may be possible to secure earlier strains of a few of these varieties by a selection of seeds from the earliest maturing plants, and making a continuous selection in this way for a few years; still it is questionable whether cow peas will ever be used to any extent as a cultivated crop in Ontario.

Varieties of Flax for Seed.

For the past two years, a test has been made of four distinct varieties of flax to determine which would give the largest yield of seed. They have given the following average yields: Manitoba, 21.5 bushels; Common, 20.9 bushels; Russian, 18 bushels; and Holland, 15.2 bushels of seed per acre. It should be stated, however, that six plots of each variety were sown, with varying amounts of seed running from one-quarter bushel to four bushels per acre, and in each case the yield given above is the average of the six plots. On the average, the plots sown at the rate of two bushels of seed per acre were the most productive, and where this quantity of seed was sown the varieties yielded as follows: Common, 24.9 bushels; Russian, 24.1 bushels; Manitoba, 23.9 bushels; and Holland, 19.4 bushels per acre.

Potatoes.

A great variety of valuable experiments have been conducted with potatoes during the past fifteen years, and in 1906 there were upwards of two hundred and thirty plots, making in all about three acres of land devoted to the potato tests on our trial grounds this year. As it is probable that an exhaustive bulletin on "Potato Culture" will be published by the Department during the coming year, the results of the experiments above referred to are withheld at the present time.

Varieties of Swede Turnips.

Twenty-eight kinds in all were grown in 1906, and among these the Rennie's Queen stood first with a yield of 19.4 tons of roots per acre. Twenty-four of these varieties have been tested for the past three years, and among these Rennie's Queen again stands first with an average yield of 24.2 tons per acre, and Sutton's Queen second with 24.1 tons. Five varieties which have been given a five years' test gave the following average yields of roots: Hall's Westbury, 21.9; Sutton's Magnum Bonum, 19.2; Hartley's Bronze Top, 19.2; Buckbee's Giant, 19.2; and Kangaroo, 18.6 tons of roots per acre. The Rennie's Queen, which has given such splendid results for the past three years, is a very nice, smooth turnip, well suited for the shipping trade.

Thinning Swede Turnips at Different Stages of Growth.

In 1905, and again in 1906, a duplicate experiment was conducted to determine, if possible, whether it is more desirable to thin turnips when they are quite small or to leave them until the plants have attained a somewhat greater growth. In this test, the plants on plot No. 1 were thinned when about one-half inch high; those on plot No. 2 when about two inches high; those on plot No. 3 when five inches high; and those on plot No. 4 when eight inches high. The average results for the four tests in the two years show that the largest crops of roots was obtained when the plants were thinned at the time when they had attained a height of about two inches. When the plants were left until they had grown to a height of eight inches before thinning, the yield was about one-third less.

Mangels.

The average acreage of mangels in Ontario for the past twenty-five years was 38,500. To show the great increase in the production of this crop, it is only necessary to state that in 1906 there were 69,352 acres in the Province. This increase shows the great value that stock feeders place on this class of roots at the present time. We have tested twenty-six distinct varieties during the past season and twenty-two of these have been under experiment for five years in succession. As there is a great difference in the amount of crop produced by the individual varieties, it is deemed advisable to print the following table in order that readers may compare for themselves:

Variety.	Tons of Tops per acre.	Tons of Roots per acre.	
	Average of 5 years.	1906.	Average of 5 years.
Yellow Leviathan	5.6	35.6	34.1
Sutton's Mammoth Long Red	5.5	38.2	33.8
Evan's Improved Mammoth Sawlog	6.3	38.3	33.5
Griewener	2.8	40.3	33.2
Steele-Brigg's Giant Yellow Intermediate	5.4	36.8	33.1
Mammoth Golden Giant	5.6	37.3	32.6
Carter's Windsor Prize Taker Yellow Globe	2.2	36.2	32.3
Rennie's Perfection Mammoth Long Red	5.9	41.5	32.2
Ideal	2.5	37.0	31.7
Carter's Mammoth Prize Long Red	5.8	37.1	31.5
Simmer's Improved Mammoth Long Red	5.9	37.0	31.3
Cornish Giant Yellow Globe	2.1	34.1	30.9
Long White	5.9	35.6	30.9
Steele-Brigg's Giant Yellow Globe	2.4	30.0	30.5
Yellow Leutewitzer	6.2	38.1	30.2
Garton's Improved Yellow Globe	2.3	35 2	29.8
Steele's Long Red Selected	5.5	33.1	29.6
Norbitan Giant	5.3	33.8	28.7
Garton's Improved Yellow Intermediate	2.3	28.8	27.9
Garton's Long Red	5.0	32.2	27.9
Red Globe	3.9	31.5	27.0
Mammoth Red Intermediate	3.2	31.8	26.8

On examining this table carefully, we find that while Rennie's Mammoth Long Red and Griewener gave the highest yields in 1906, both of these are somewhat surpassed in yield by three other varieties in the average of the five years' test; the Yellow Leviathan here standing first; Sutton's Mammoth Long Red, second; and Evans' Improved Mammoth Sawlog, third. The Yellow Leviathan is a very desirable mangel, being good in size, shape, and quality, as well as in yield.

Soaking Mangel Seed before Sowing.—The advisability of soaking mangel seed before it is sown in order to soften the husk and hasten germination, has been much discussed among farmers. It was therefore decided several years ago to make an effort to get some definite knowledge regarding this matter by making a careful test. A duplicate experiment has now been conducted for five years, by sowing seeds which have been soaked in water for thirty-six hours, twenty-four hours, and twelve hours, respectively, on uniform plots. In each individual test one plot was also sown with seed which had not been soaked. On averaging the results of the five years' experiments, we find that soaking the seed proved beneficial in all cases. The greatest increase in yield was given when the seed had been soaked for only twelve hours; the average yield in this case was 22.8 tons of roots per acre, while the unsoaked seed gave a yield of only 20.3 tons. The results in the different years are fairly uniform, and therefore show quite clearly that it is profitable to soak the seed before planting, providing it is not left in the water too long.

SUGAR BEETS.

Varieties.—For some years several varieties of sugar beets have been grown in different districts throughout the Province for stock feeding purposes. These vary considerably, not only in the yield of roots which they produce; but also in feeding value, owing to the fact that some contain a higher percentage of sugar than others. Since the beginning of the manufacture of sugar in Ontario a few years ago, a much wider interest has been taken in the culture of this class of roots. Quite a number of varieties have been under test for some time on our experimental plots, and nineteen of these have been grown for five years in succession. Among these, the five heaviest croppers have given the following average yields of roots per acre: Giant White Feeding, 32.4; Tankard Cream, 29.9; Royal Giant, 28.9; Giant Rose Feeding, 27.6; and Rennie's Giant Sugar, 26.7 tons. Eleven out of the nineteen have given higher average yields than that produced by the Kleinwanzlebener, which is the kind used almost exclusively for the manufacture of sugar in this Province. The average yield of roots of this variety during the past five years is 21.5 tons per acre. It should be remembered that the beets of the Kleinwanzlebener variety contain a considerably larger percentage of sugar than most of the other kinds. A number of the varieties included in our plot tests have been analysed in the Chemical laboratory at this Institution, and the results of these analyses will be found in Prof. Harcourt's report of the Chemical department in another part of this volume.

Soaking Sugar Beet Seed before Sowing.—An experiment, similar to that with mangel seed referred to on a previous page, has been conducted for the past four years with sugar beet seed. Here again we have found that soaking the seed before planting has been instrumental in increasing the yield of roots. In this case, however, the seed soaked for twenty-four hours has given slightly better results than that soaked for either twelve or thirty-six hours. The unsoaked seed gave a yield of 13.3 tons of roots per acre, while the seed soaked for twenty-four hours gave a yield of 15.8 tons.

Thinning Beets at Different Distances in Drills.—For four years in succession an experiment has been conducted in thinning sugar beets to two, four, six, eight, and ten inches apart in the rows. This experiment was conducted in duplicate each year, and the Kleinwanzlebener, which is grown for sugar making purposes, was used throughout. The average results of the eight tests in the four years are presented in the following table:

Distance between plants.	Average weight per root.	Average yield of roots per acre.
	Pounds.	Tons.
2 inches	.45	19.15
4 inches	.72	16.86
6 inches	.91	16.98
8 inches	1.12	16.76
10 inches	1.36	16.33

A study of this table reveals the fact, that when the beets were thinned to a distance of only two inches apart the roots were quite small, but the yield per acre was larger than when the beets were thinned to greater distances. This is contrary to the common idea that beets should be thinned to a distance of ten or twelve inches in order to get a large growth of the individual roots if the largest possible yield is to be obtained. Of course, it must be borne in mind that while close thinning results in large tonnage of crop per acre, it involves a greater amount of work both in thinning and in harvesting the crop.

Thinning Beets at Different Stages of Growth.—The average results of a four years' test in thinning beets when they have attained a height of one-half inch, two inches, five inches, and eight inches on different plots, shows that the largest yield was obtained by thinning plants when they were two inches high, and the smallest yield by thinning when the plants had attained a height of eight inches.

Growing Beets on the Level and on Ridges.—Sugar beets have been grown on the flat and on ridges in the Experimental Department for the past five years, with the result that those grown on the level gave an average yield of 19 tons per acre, and those grown on ridges a yield of 18.1 tons per acre. This is an excess of nearly one ton per acre in favor of level cultivation.

VARIETIES OF CARROTS.

Experiments conducted with many varieties of carrots go to show that the long, deep-rooted varieties which were once so commonly grown, are no longer desirable. During recent years a number of varieties of medium length and greater thickness have been introduced, and the following tabulated figures will show how these intermediate varieties are at present surpassing the old White Belgian type in yield, besides being much easier to harvest:

Variety.	Average results for 5 years.	
	Tons of tops per acre.	Tons of roots per acre.
Mammoth Intermediate Smooth White	7.0	31.9
Steele's Improved Short White	6.9	30.9
Iverson's Champion White Intermediate	6.3	30.8
Carter's Hundred Ton	6.3	30.8
Mastadon White Intermediate	6.3	30.6
Sutton's Matchless White	8.3	30.3
Simmer's Short White Vosges	6.6	28.8
American Beauty	6.3	27.4
Large White Belgian	6.5	27.2
Large White Vosges	6.0	26.9

In addition to the information given in the above table, it may be mentioned that among nineteen varieties grown on our experimental plots in 1906, the five varieties which stood at the top of the list in amount of crop produced, yielded as follows: Iverson's Champion White Intermediate, 31.8 tons; Mammoth Intermediate Smooth White, 31.2 tons; Simmer's Short White Vosges, 30.5 tons; Steele's Improved Short White, 29.7 tons; and Carter's Hundred Ton, 29.5 tons of roots per acre. It is interesting to notice that four out of these five varieties are included in the foregoing table.

CORN.

While corn is not grown quite so extensively in Ontario as it was a few years ago, still it is one of our most valuable fodder crops, excepting in the northern districts, and it is also grown to a considerable extent for the production of grain in the southern counties. For fodder purposes alone the Province had a crop of more than 180,000 acres in 1906. This would seem to be sufficient to warrant some careful experimental work being done at this Station to discover, if possible, the varieties most suitable for growing and the best methods of planting and cultivating. Already a great amount of careful work has been done, and reports of the experiments have been published from time to time. It should be stated, however, that it is probably more difficult to conduct satisfactory experiments with corn than with any other farm crop for the following reasons:

(1) It is not possible to grow distinct varieties side by side without their becoming mixed, because corn is naturally cross fertilized through the agency of the wind; hence it is necessary to get fresh seed of all varieties each year, and it cannot always be obtained from the same sources as in previous years.

(2) There is such a great difference in the length of season required for the maturing of different kinds, that variety tests must be, to a considerable extent, a matter of locality.

Notwithstanding these difficulties, however, the variety tests conducted at this Station should serve as a general guide to the farmers in most parts of Ontario, by indicating to them the kinds which are likely to be suitable for their respective localities.

One hundred and forty-five varieties were grown at this station in an experimental way for fodder purposes in 1906. Many of these produced matured grain before the first frosts came in the autumn, while the larger number were in a more or less immature condition. Those which gave the largest tonnage of green fodder per acre, including stem, leaf, and ear, yielded as follows: Austin's Colossal Yellow Dent, 26.1 tons; Pennsylvania Early Dent, 25.4 tons; New Century Wonder, 24.5 tons; Chase's White

Dent, 24.1 tons; Mogul, 23.6 tons; Kansas Sunflower, 23.5 tons; and Henderson's Eureka, 23.5 tons. Among these, the Chase's White Dent gave the largest yield of ears, and the Henderson's Eureka stood second in this respect. In both cases, however, the ears were in a somewhat immature condition, having reached only the milk stage, so that while the total yield of green crop was large, the ears were so green that the quality of the ensilage made from this variety would not be first-class. These two kinds might, however, be recommended for growing for fodder purposes in the southern part of the Province, where they would likely reach a sufficiently advanced stage of maturity to make ensilage of first class quality. Among the one hundred and forty-five varieties grown, the following five were the best producers of ears, and yielded in the order in which they are placed: Triumph Sugar, 5.8; Top Notch, 5.5; Howe's Yellow Dent, 5.4; Pharaoh's Dream, 5.4; and Early Butler, 5.4 tons of ears per acre. Among these five, the Top Notch produced the largest total amount of green crop, giving a yield of 18.8 tons per acre. It will be seen, therefore, that while these varieties produced a large yield of ears which had reached a more advanced stage of maturity, the amount of ensilage produced by any of them would be small compared with that produced by the heavier yielding varieties mentioned above.

The variety of corn best suited for any given locality for the making of ensilage will be one which will produce a maximum total yield, and a large proportion of ears which have reached the dough stage before it is time to cut the crop in the autumn. Taking into consideration the results of the experiments conducted for the past five or six years, we conclude that such varieties as Henderson's Eureka, Mastadon Dent, and probobly Chase's White Dent would likely give good satisfaction as ensilage corns on the warmer soils of southern Ontario. On the heavier soils in the south and on medium soils in the central part of the Province, White Cap Yellow Dent, Wisconsin Earliest, White Dent, and some of the earlier strains of Leaming are giving splendid satisfaction. We have no Dent corns, however, which are early enough to give general good results in the northern counties, and it is likely that for some years at least Flint varieties will be used altogether in the north. Judging from all of our experience, I would say that the King Phillip, Salzer's North Dakota, Compton's Early, and Longfellow should give best results in the northern districts.

Methods of Cultivating Corn.—In the spring of 1902, an experiment was commenced to determine the relative value of different methods of cultivating the corn crop during the season of its growth. This experiment has now been carried on for five years and has been conducted in duplicate each season. Four plots were used for each individual test. The one which produced the highest yield of green fodder in the average of the five years was given deep cultivation between the rows in the early part of the season, gradually getting shallower at each successive cultivation as the season advanced. This method resulted in an average yield of 20.7 tons per acre. Another plot which was given shallow cultivation throughout the season produced 20.3 tons per acre. A third plot which was given shallow cultivation at first, gradually getting deeper, produced 20 tons per acre, and a fourth which was given deep cultivation throughout the season produced 19.9 tons per acre. It will be seen, therefore, that there was less than one ton of difference in the yield resulting from the various methods mentioned above. When this experiment was commenced it was expected that the plan of cultivating deeply at first and to a lesser depth as the season advanced, would result in the greatest yield, since that method would avoid interfering with the growth of the corn roots after they had begun to extend through the soil between the rows. It may be said, however, that the difference in yield is not so great as we anticipated.

Other experiments with corn which have been under way for one or more years will not be reported upon until they have been conducted for a sufficient length of time to furnish reliable results.

Varieties of Sorghum for Fodder.—Sorghum is a general name applied to a class of plants which somewhat resemble corn, but differ from this in producing their seed in the tassel at the top of the the stem instead of on the cobs. While all varieties of sorghum bear more or less resemblance to one another, they may be divided into two general classes, namely, saccharine and non-saccharine; or those possessing a large percentage of sugar, and those possessing a much smaller percentage. Seventeen varieties in all were tested on our trial grounds in 1906, and of these, eleven have been under experiment for the past eight years. The following table gives the average yield of green crop per acre obtained from each of these eleven varieties:

Varieties.	Heads	Total Crop
	Tons.	Tons.
Orange Sugar Cane	.33	19.02
Early Minnesota Sugar Cane	.86	18.32
Early Amber Sugar Cane	.76	16.63
Fodder Cane	.79	16.44
Kaffir Corn	.50	12.93
California Golden Broom Corn	1.58	11.92
Improved Evergreen Broom Corn	1.32	9.99
Early Japanese Broom Corn	1.47	9.53
Yellow Millo Maize	.63	9.35
Dwarf Broom Corn	1.40	9.12
Brown Dhoura Corn	.78	7.72

On looking over this table, it will be noticed that the first four varieties have given considerably larger yields than the others. These are all saccharine sorghums, and are therefore not only good yielders but the crop is of high feeding value owing to the large percentage of sugar contained in it. While the broom corns mentioned in this table are grown to a slight extent for the production of fodder, they are used more extensively in the manufacture of brooms, for which purpose the heads only are used; and a glance at the table will show at once that the broom corns have given considerably larger yields of heads than any of the other kinds. The Early Amber Sugar Cane is probably the most commonly grown variety in Ontario, and has been used in a few localities for the manufacture of syrup, though it can scarcely be said that this has been a profitable industry anywhere in the Province.

MILLET.

The commonly grown varieties of millet are divided into three distinct classes: those having branching heads somewhat resembling the heads of broom corn are commonly called broom corn millets; those having heads of about the same form as our ordinary Hungarian grass are called foxtail millets. There are several varieties of each of these classes. The third class, of which there is but one variety at present under cultivation, is called barnyard millet.

Varieties of Millet for Fodder Production.—Quite a large number of varieties have been tested on our experimental grounds within the past fifteen years. Eleven distinct kinds have been grown side by side for twelve years in succession. Among these, the five best producers of green crop have yielded as follows: Golden Wonder, 11.2 tons; Holy Terror Gold Mine, 10.7 tons; Japanese Panicle, 10.5 tons; Japanese Barnyard, 10 tons; and Magic, 9.9 tons of green fodder per acre in the average of the twelve years' work. Among twenty varieties which have been grown for the past five years, five of the best have given the following yields: Japanese Panicle, 10.1 tons; Golden Wonder, 9.9 tons; Japanese Barnyard, 9.6 tons; Holy Terror Gold Mine, 9.3 tons; and Magic, 9 tons per acre. It will be noticed here that the same five varieties stand at the top of the list in yield among the eleven kinds grown for twelve years, and among the twenty kinds grown for five years. This seems to be conclusive evidence as to the value of these five varieties. The Golden Wonder, Magic, and Holy Terror Gold Mine belong to the foxtail class of millets; the Japanese Panicle to the broom corn class; and the Japanese Barnyard is the one variety of this class mentioned in the early part of this paragraph.

Sowing Millet at Different Dates.—In 1906, an experiment was conducted by sowing one variety of each of the three classes of millet on eight different dates at intervals of about two weeks; the first three plots being sown on May 2nd and the last three on August 17th. In each case the crops were cut when they had attained their full growth and before they commenced to ripen, excepting those plots which had not attained their full growth when the frosts came in the autumn. The varieties used in this test were Japanese Panicle, Japanese Barnyard, and Hungarian. The plots of Japanese Panicle and Japanese Barnyard sown on August 1st and August 17th, and the plot of Hungarian sown on August 17th were frozen when they had attained a growth of but a few inches. This experiment will be conducted for several seasons, and the chief object in conducting it is to note carefully the relative growth of the different classes of millet when sown at different periods throughout the summer. The detailed results will not be published until a later date, but it may be said that on averaging results obtained from the three varieties, the highest yield was obtained from the first sowing on May 2nd; and the yield decreased as the time of sowing was delayed in each case, excepting that the seeding of July 14th gave a slightly higher yield than that of June 30th.

VARIETIES OF RAPE, KALE, CABBAGE, ETC.

The Dwarf Essex rape has been grown considerably in some parts of Ontario for many years past. It has been used principally as a pasture crop for sheep, but has also been used for feeding, both in the field and in the stable, to young and growing cattle and to hogs. As there are quite a large number of other plants somewhat similar to rape in nature of growth and in the crop produced, it has been thought wise to make a comparative test of these different varieties and classes of crop in order that information may be gleaned as to their relative value for the farmers of Ontario. Therefore, seed of different varieties of rape, kale, Brussels sprouts, and those varieties of cabbage which are grown to a certain extent in Great Britain for feeding purposes, was imported principally from England and other European countries for experimental purposes. These have been introduced from time to time, and we now have the results of tests conducted with fourteen different varieties in each of the past seven years. The seed of these varieties have been sown at the rate of about two pounds per acre, in rows nearly twenty-seven inches apart. The crop has been cultivated in much the same way as turnips. The following table gives the average yield of green crop per acre produced by each of fourteen varieties for a period of seven years:

Sutton's Earliest Drumhead Cabbage	22.3	tons per acre
Thousand Headed Kale	19.9	" " "
Dwarf Essex Rape	19.0	" " "
Dwarf Victoria Rape	18.7	" " "
Purple Sprouting Broccoli	18.5	" " "
Sutton's Earliest Sheepfold Cabbage	18.1	" " "
Marrow Collards	17.5	" " "
Hardy Curled Kale	17.2	" " "
Sutton's Best of All Savoy Cabbage	17.0	" " "
Marrow Stem Kale	16.8	" " "
Jersey Kale	16.5	" " "
Tall Green Curled Scotch Kale	14.4	" " "
Brussels Sprouts	13.5	" " "
Sutton's Latest Drumhead Cabbage	13.2	" " "

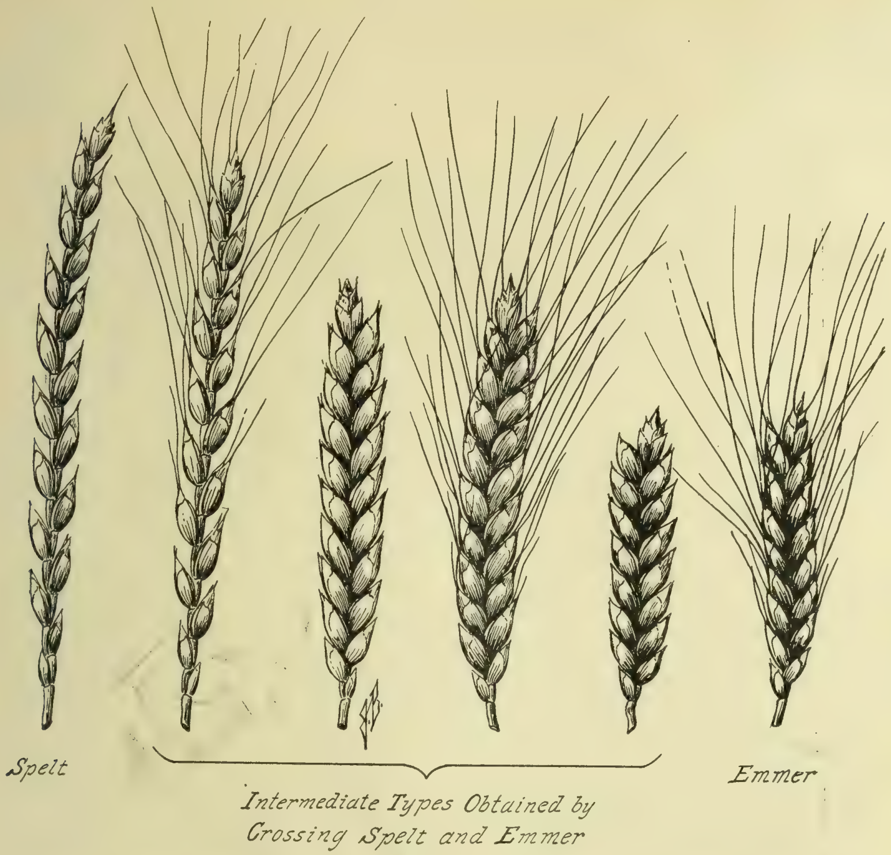
In 1906, there were in all thirty varieties of this class of crops tested on the experimental field. The five largest producers of green crop stood in the following relative position in regard to yield: First, Sutton's Earliest Drumhead cabbage; second, Thousand Headed kale; third, Sutton's Giant Drumhead cabbage; fourth, Dwarf Essex rape; fifth, Large Seeded Umbrella rape.

Besides the experiments discussed in this report, a number of others are under way and the results of these will be presented from time to time in the future as they become of value to ourselves and to the public.

In conclusion, I wish to thank you most heartily for the encouragement and support you have given me in the work of the department during the absence of Professor Zavitz.

Respectfully submitted,

J. BUCHANAN.


Spelt
Intermediate Types Obtained by Crossing Spelt and Emmer
Emmer

A section of our plant breeding grounds, showing winter wheat tests.

PART XIV.

THE LECTURER IN FORESTRY

To the President of the Ontario Agricultural College:

Sir,— I have the honor to present herewith the report of the Forestry department for the year 1906.

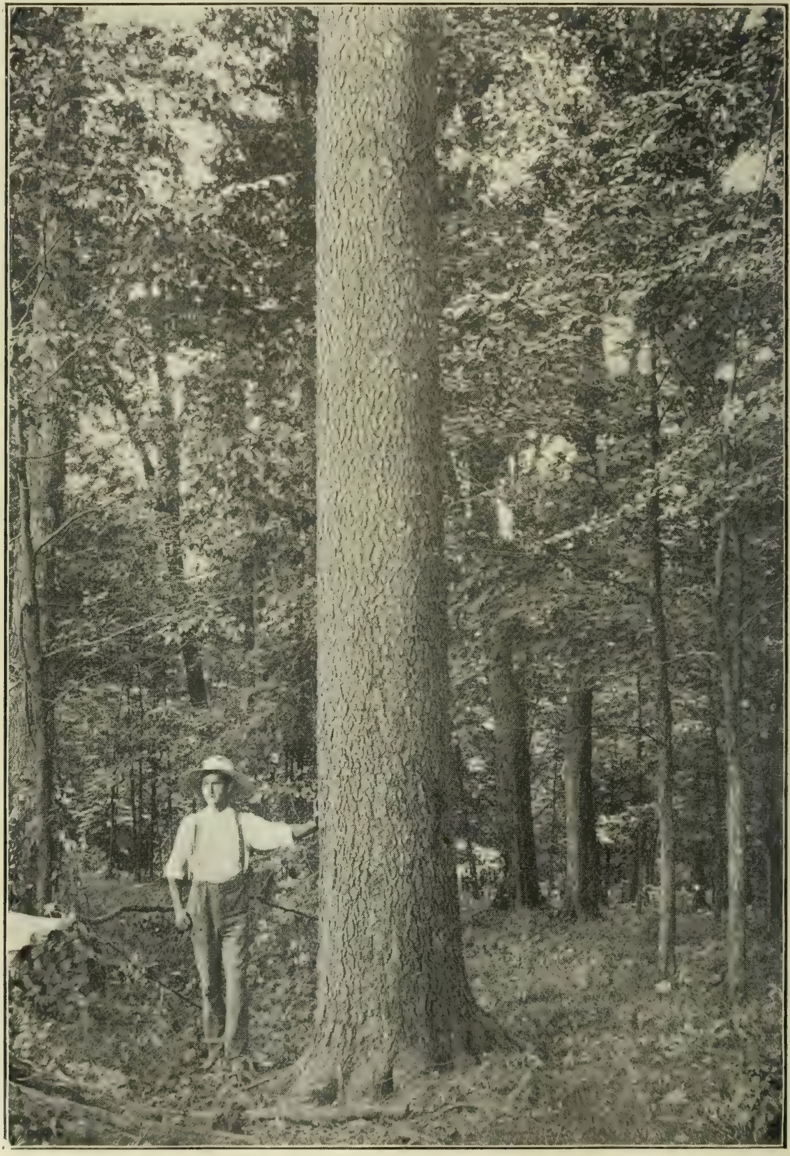


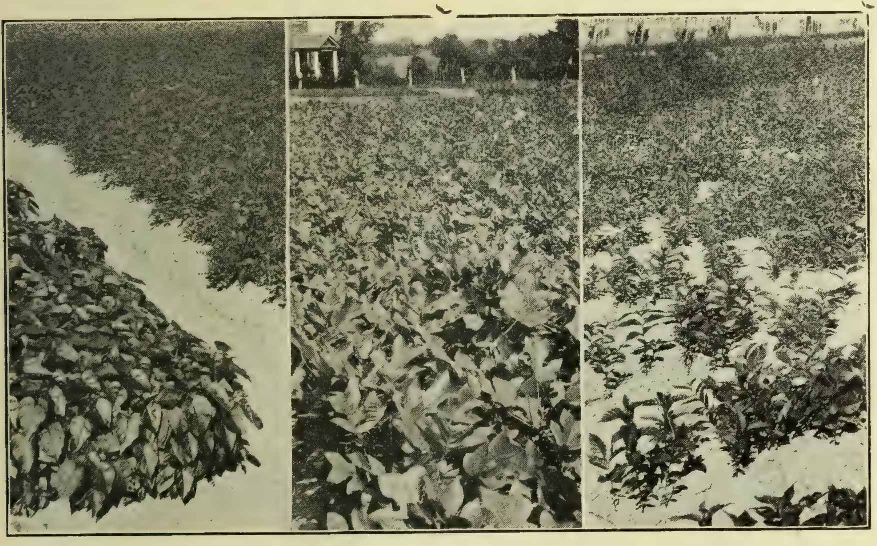
Fig. 1.—Black Cherry, thirty inches in diameter in south College woodlot. From this species of Cherry the valuable red cherry finishing and furniture wood is obtained.

The courses of lectures as outlined in the College circular have been delivered to the second and fourth year students. Lectures have also been delivered to the Nature Study students. The endeavor has been to give the students a general knowledge of forest conditions, but more especially to teach the principles of forestry as related to the farm. It has been assumed that a knowledge of tree growth in relation to planting waste land and protection belts and the care of the woodlot, is indispensable to the present day agriculturist.

A bulletin on Farm Forestry has been prepared which deals in detail with tree planting in its various phases and the care of the woodlot.

College Woodlots.

Improvement work has been carried on in the College plantations and woodlots. Dead branches have been pruned out of plantations and gaps planted about borders with Norway spruce. The woodlot at the south of the Farm contains a ridge which had so few trees left that grass and weeds took possession of the soil. This ridge has been cleared and prepared for the planting of native White Pine. In early planting work on this farm foreign Pines were planted, but there exists no plantation of our native White Pine. I believe that the Native White Pine would have given better results in this soil than the foreign pines, and hope to demonstrate it by making it test planting in the denuded part of the south woodlot.



Catalpa. Tulip. White Elm.

FIG. 2. Seedlings in College Nursery.

Considerable lumber of Maple, Basswood and Elm was supplied to the Mechanical department from trees taken off this ridge in the south woodlot, A quantity of stove wood cut from trees or parts of trees which could not be utilized for lumber, was distributed amongst departments for fuel. As no cutting cr care was given the woodlots for a number of years, there exist many defective and overmature trees which will gradually be taken out and utilized as fuel or lumber.

The north woodlot had no definite boundary and was open to stock-grazing. This year a fence was placed about this woodlot and a parcel of land about three acres in extent which was naturally included in the woodlot. A corner of the woodlot about one quarter of an acre in extent was left in the adjoining field as a clump for protection to stock in the summer. Fields which are frequently pastured and permanent pastures should have clumps of trees for the protection of stock during the heat of the day.

The three acres which have been incorporated with the northern woodlot will be planted with Black Locust and Hardy Catalpa as an experiment in producing fence posts. This woodlot is a fair type of the average Ontario woodlot as it has had an indefinite boundary and borders filled with weed trees and sod, neither pasture nor woodlot. It is desired to make every foot of the soil now fenced in produce tree growth of value.

NURSERIES.

The nursery work has been enlarged this past season by the addition of the Holmwood Nursery ground, four acres in extent. As was intimated in last year's Report, this ground is being used in growing evergreens. In this nursery we have seed beds of Norway Spruce, White Spruce, Arbor Vitae or White Cedar, and White Pine.

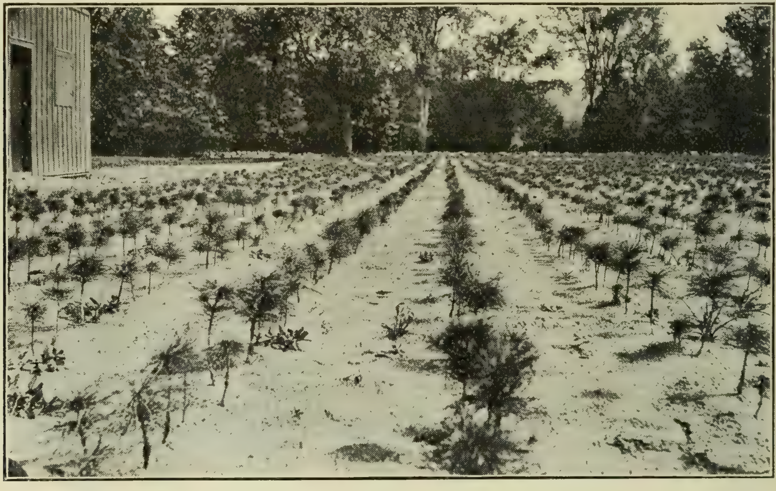


FIG. 3. Three year old White Pines in Holmwood Nursery.

At present the most practicable method of obtaining evergreen planting stock for our work is to import the seedling and place it in the Nursery until ready for distribution. This applies to Norway Spruce, Scotch Pine, Larch, and White Pine. In the case of White Pine we buy the two-year-old seedling in Germany for about seventy-eight cents per thousand. This plant is placed in our nurseries for one year and is then ready for distribution.

The best 1906 American quotation on White Pine is sixteen dollars per thousand for three-year-old transplants, and five dollars per thousand for two-year-old seedlings. This great difference is partly owing to the availability of cheap labor in German nursery work and partly to the perfect organization of their nursery work.

The following planting material was imported this last season:

10,000—3 yr. old Scotch Pine.
50,000—1 yr. old Scotch Pine.
50,000—4 yr. old Norway Spruce.
50,000—2 yr. old White Pine.
75,000—3 yr. old White Pine.

The greater part of three and four year old planting material was used in last season's co-operative work. The remainder of the Nursery stock was placed in the Holmwood Nursery in preparation for planting this coming season. There is at present in the Holmwood Nursery the following:

White Pine—1 yr. old Seedlings.......... 150,000	
" " —3 " " Transplants	45,000
" " —4 " " "	15,500
Norway Spruce—1 yr. old Seedlings...	50,000
" " —5 " " Transplants	10,000
Scotch Pine—2 yr. old Transplants	17,500
" " —3 " "	15,000
Arbor Vitae—1 yr. old Seedlings......	25,000

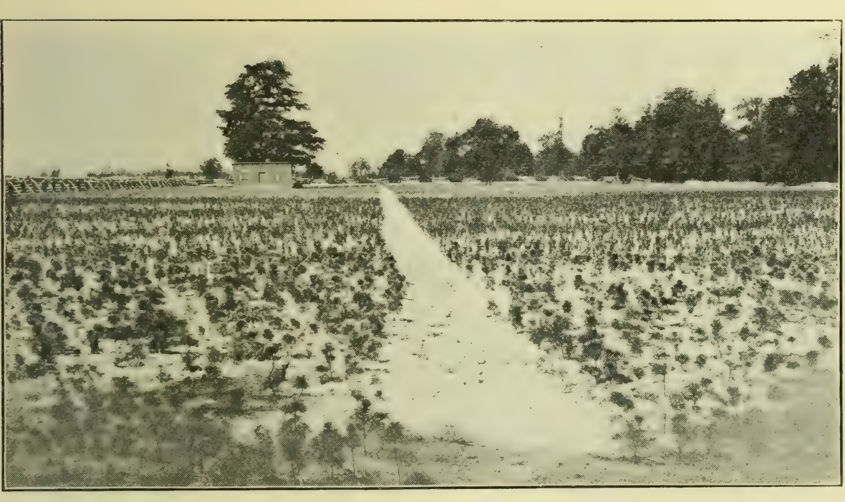


FIG. 4. Holmwood Nursery.

The Nursery at the College has been mainly devoted to growing hard woods for experimental and co-operative work. In this Nursery we have trenched or heeled in the following:—

Tulip or Whitewood, 2 yr. old...	11,500	White Elm, 1 yr. old	22,000
Tulip or Whitewood, 1 yr. old......	2,000	Soft Maple " "...	8,000
Box Elder or Manitoba Maple, 1 yr. old	12,000	Black Locust, 1 yr. old... ...	18,500
Black Cherry, 1. yr old......	2,000	Red Oak " "	12,500
Hardy Catalpa 1 " "	30,000	Butternut " "	200
		Black Walnut " "	500
		Hickory " "	1,000
		Chestnut " "	100

There is also at these grounds 40,000 Norway Spruce, three year old transplants, which will be transferred to the Holmwood Nursery for another year.

In addition to the above forest nursery stock we have in the College Nursery a quantity of special planting material to be used in landscape work about the College. Landscape planting work from this material has been commenced by planting a coniferous belt along the western boundary of the Macdonald grounds.

CO-OPERATIVE PLANTING.

The Forestry problem can probably develop more sentiment in a given time than any other known branch of work when brought under discussion. Everybody likes trees in the abstract and has nice things to say about them.

Popular discussion is valuable, but what is needed in this Province is thorough demonstration of the practicability of redeeming waste lands and making them productive.

Believing that the demonstration of such work can be carried out only by Government assistance, and that such work is the chief function of a Department in Agricultural Forestry, we are giving the co-operative planting work the greater part of our attention.

The following is a copy of Circular No. 1 which has been published for distribution this last season:

The Department of Agriculture of the Province of Ontario desires to assist farmers to improve their woodlots, plant shelter belts and reforest waste portions of the farm. To accomplish this a system of co-operation is to be carried on as follows:

The Department, as far as the means at its disposal will permit, will assist in the growing of a forest plantation, woodlot, shelter belt or wind break, by directing through one of its officers as to preparation of soil, varieties to plant and manner of planting and as to care after planting.

The Department will also endeavor to furnish tree seeds, seedling trees or cuttings as planting material free of charge, but the person receiving such material shall pay the cost of transportation by express to nearest express office.

Two acres will be the largest area for which the Department will undertake to furnish planting material in any one year. Larger areas may be planted by arranging to continue the work through successive seasons.

It shall be understood that the owner, on his part, must prepare the soil, plant and care for the trees, and do all the actual work in connection with the plantations, in accordance with the directions of the officer of the Department.

The owner shall also agree to provide protection for the planted trees against animals by fencing or otherwise, and where necessary, against fire by some effective means.

The Department prefers to make plantations on such waste portions of the farm as steep hillsides, light sandy, rocky or gravelly spots, swamp land, portions of farm cut off by streams or otherwise. Such land can usually be profitably devoted to wood production if proper species are planted. However, in certain localities without woodlands it may be found advisable to plant on good agricultural soil, if the owner so desires. In cases where tillable land is to be planted, it will be advisable to summer fallow. Cutlivation for one or two seasons after planting on good soils, where rank weed growth might follow, will be of great benefit to plantation.

It will be noticed that this system is co-operative in character. The Department furnishes planting material and expert advice, but does not guarantee to furnish any specific quantity of planting material. The Department reserves the right to accept or refuse applications if in the opinion of the officer in charge the location offered does not afford satisfactory facilities for the experimental and educational features of the work.

It is desired to make this work of educational value, and the owner will be required to allow public inspection of the planted areas whenever this can be done without injury to other crops.

No fruit trees or ornamental shrubs will be distributed by the Forestry Department. No trees will be furnished for planting on town or village lots, or for ornamental purposes. All trees sent out, with the exception of those required for the improvement of rural school grounds, must be for protection or wood production purposes.

The Department does not undertake to distribute nursery stock of such species as oak, walnut, hickory, chestnut, etc. Nut trees can be best grown by planting the nut instead of the young plant, and the owner wishing to grow such species should collect the seed himself, or where this is impossible the Department will endeavor to supply him. In case the owner can obtain nut seeds in his own locality, the Department will give advice as to the methods of collecting and storing.

Last spring planting work was done in the following Counties: Stormont, Durham, Simcoe, Ontario, Halton, Wentworth, Wellington, Brant, Waterloo, Perth, Oxford, Norfolk, Lambton, and Essex. Space will not permit detailed description, but we hope to publish results as soon as it is possible to form a judgment of these plantings. A brief description of two typical cases will serve to show the possibilities of this work. In last year's Report a cut was shown of waste sand land planted in Durham County. About two acres of this land was planted in the spring of 1905. Norway Spruce was planted about the border and the body of the plantation was of native White Pine. The plants were spaced about five feet apart each way. This planting was done without previous cultivation, as it is rough land with areas of blow-sand. Planting lines were made by skimming light furrows with the plow. The plants were put in with a common spade and two boys and a man planted about an acre per day. In such soil it should be possible for two men to plant an acre per day. In the autumn of 1905 about ninety-five per cent. of the White Pines were alive. The Norway Spruce did not do as well, only about seventy-five per cent. growing. Our Native White Spruce would probably do better on this soil. I was afraid of the winter, which was very open with sudden changes of temperature. However, the White Pine showed no winter killing, even in the exposed positions, which was very gratifying. This planting was continued this spring, and in time the owner hopes to have the whole area under trees. It is now a waste field of about eleven acres.

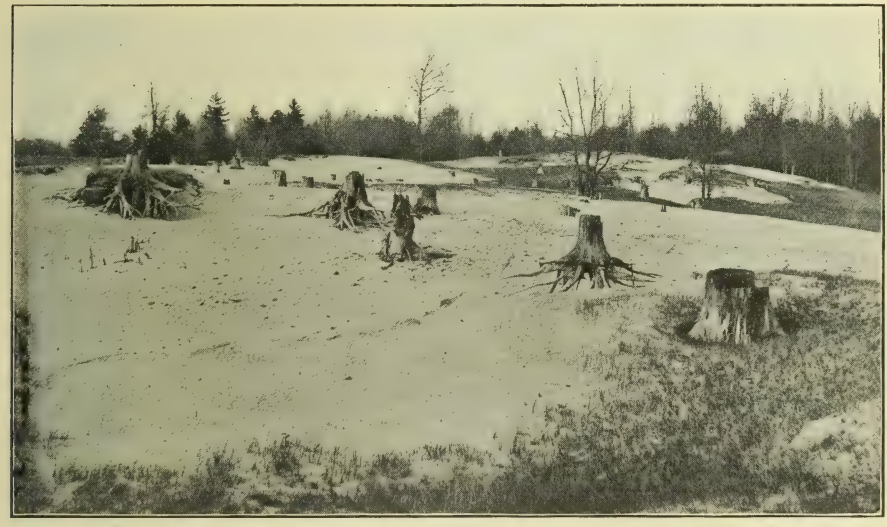


FIG. 5. Type of waste land in Norfolk Co., which once produced splendid pine.

Another type of planting done this last spring in Perth County was with White Pine on a steep hillside. The soil was a loam but very stony. In this planting the preparation of the planting holes took longer, as did the actual planting. The plants were placed about five feet apart each way, the sod was cut off with an old adze, the soil loosed of stones with a pick and the plants put in with a spade. This work probably under any conditions would take twice as long as planting in waste sand land. Planting waste land with White Pine may require anywhere from two men per day per acre to four men per day per acre.

This last spring about twenty plantations were made in the above mentioned counties, and the species used were White Pine, Norway Spruce, Scotch Pine, Larch, Red Oak, White Ash, Elm, Black Locust, and Black Walnut. In all about eighty thousand plants were distributed.

This coming season we hope to make plantations in nearly every county in the older portion of the Province as well as continue where planting has commenced. Applications are coming in from many parts of the Province, and there is a general desire to plant trees. As the practicability of waste land planting becomes understood I anticipate a great demand for planting material.

There are portions of the Province where tree planting is especially required, and to these special attention should be devoted. It is desirable to make a special study of reclamation work in Norfolk County, where sandy wastes are developing; in Simcoe County, where large areas of sandy plains exist which will never be of value in food crop production; along the northern shore of Lake Ontario in what are known as the old pine ridges; in the sand formations along Lake Huron, in Prince Edward County, and along the lakes or rivers where erosion is gradually taking away the land.

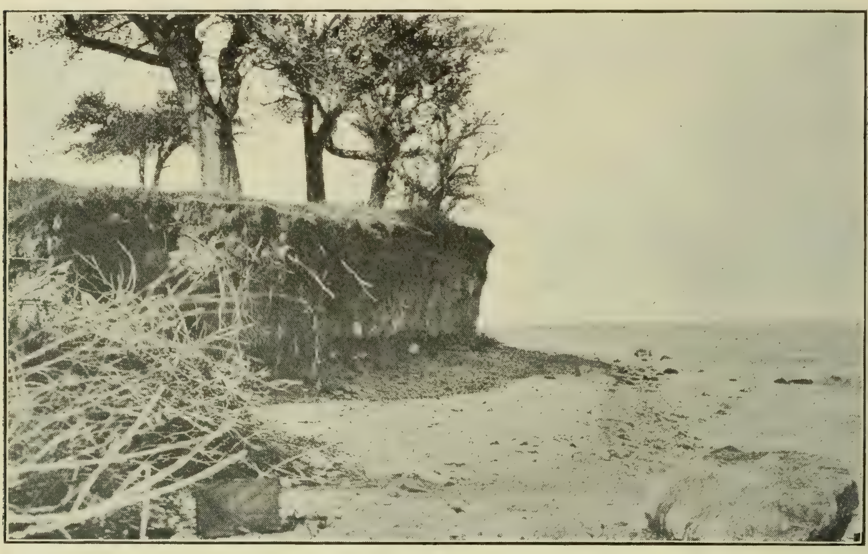


FIG. 6. Showing erosion of bank on Lake Ontario near the Government Fruit Farm at Jordan. Part of the apple orchard has been taken away in the last few years. Tree planting should remedy this breaking away.

The first requirement for carrying out co-operative planting is the forest nursery. We have now a nursery for evergreens, which can be extended as the work develops. I beg to draw your attention to the fact that evergreens are the best suited to waste land planting, and that it takes from three to five years, from the seed, to produce evergreen plants ready for final planting. The possibility and advantage of importing seedling evergreens mentioned above has made it possible to have planting material ready for the coming season.

Conscientious and intelligent labor is required in the successful production of evergreen planting stock. The greater portion of the work occurring in the spring, or for a limited season, makes this one of our greatest problems. The possibility of obtaining suitable student labor during the holidays gives us a solution of the problem for the present.

Respectfully submitted,

E. J. ZAVITZ.

PART XV.

THE MANAGER OF THE POULTRY DEPARTMENT.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit herewith my annual report of the Poultry department for the year 1906.

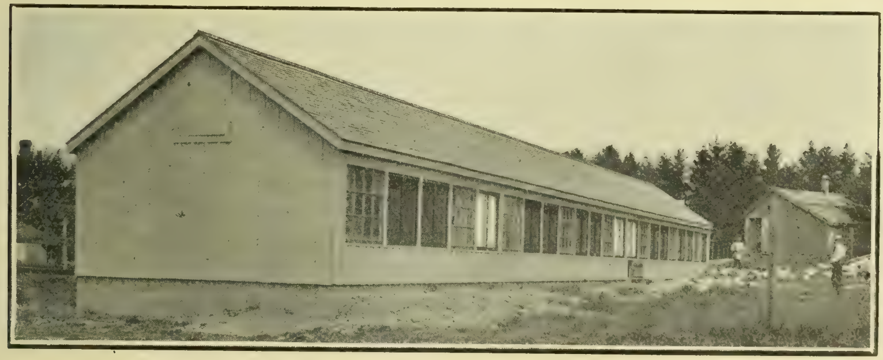
CLASS-ROOM WORK.

The class-room work for this year was much the same as has been reported in previous years. Lectures were given to the regular course students, to the students at Macdonald Institute and to the Short Course students.

The Short Course in Poultry was well attended. At the close of the Short Course last year we held a Poultry Institute, a full report of which has already been published. This meeting fills a long-felt want among poultrymen and is much appreciated by those engaged in poultry keeping.

NEW BUILDINGS.

Four new buildings have been constructed during the year—one house 108 feet long by sixteen feet wide. This house is constructed on a cement foundation. The walls are built of single ply boards and covered with battens. The front of the building is about one-third glass and two-thirds cotton. The ceiling is made of boards laid some four inches apart and covered with straw. Our experience with houses in previous years has led us to believe that curtain fronts and straw lofts are excellent.



New Poultry House at O.A.C., Guelph.

We propose to test hens for egg production, etc., in large and in small flocks. The house is divided into three pens with tight board partitions between to prevent draughts. We shall try the first year flocks of 60, 90, and 120 each with equal floor space per bird.

The other three houses are smaller in size, but are built upon much the same principles with the exception that the houses are movable. These houses would answer either for hens or ducks.

FEEDING.

In previous reports I have described in a general way the plan we use in feeding, care and management of the stock birds. Several have written to know exactly what and how we feed our hens. One requires to use considerable judgment in feeding, because a bird seldom needs exactly the same food in the same proportions any two weeks in the year; for example, when hens are laying a large number of eggs more food is required and, if in winter, the quantity of meat in the ration could be increased to advantage. To be brief, we feed each morning a handful of wheat or cracked corn to every two hens in the pen. If the hens are laying very few eggs and the breed is small in size, perhaps a handful to four birds would be sufficient. This food is buried in straw so as to make the hens work. Vegetables are kept constantly in front of the fowls, as is also water and beef scrap. The beef scrap may not be absolutely necessary, but if a fowl needs animal food I prefer letting them have it whenever they want to eat it. About once a week we feed some cut bone. If we had plenty of bone, more would be fed —a little every day. Cut bone, cooked meat, etc., are good foods, and where they can be secured untainted I would not feed beef scrap.

The night food usually consists of sprouted oats or barley. I believe that soaking the grain in warm water for four or five hours would make oats or barley more palatable. This is fed from troughs and all they will eat of it. A change may be fed once a week in the way of stale bread, or possibly some other mash food, in place of the oats.

On cold or dreary days a little of the screenings from under the thresher is fed in the litter at noon just to keep the birds moving. In winter we feed frequently dry or steamed clover leaves or give a forkful of hay to a pen of birds.

INCUBATION.

Last year we mentioned in our report some observations in regard to what was called white diarrhoea or non-absorption of the yolk. It was mentioned there that we considered one of the causes to be a lack of ventilation in the incubator room. Our experience this year, also the reports that have been sent in by one experiment station and by individual operators, seems to go to prove that a strong odor of coal oil in the incubator or room is bad; at least, under these conditions, machines gave poor results, but when the room was well ventilated no bad results were noticeable. These results were reported by a number, but there are a few places where the ventilation appeared to have no effect.

We have found the incubator question to be very complicated, and after careful consideration we decided, with the aid of the department of Physics and Chemistry, to make very careful tests both in natural and artificial incubation. We wished first to find out what a hen does during the process of hatching, as regards temperature, evaporation and air conditions, both as to composition and circulation. This has taken a large amount of detail work. Our results are nowhere near complete, but we have made considerable progress. From our experiments so far we find hens can hatch chickens under a wide variation as to evaporation, but the point is, what of the vigor of the stock so produced? We hope to follow this closely next season. We have operated incubators at high and low temperatures, machines with very moist air, and with very dry air, etc. It is impossible, at present, to draw definite conclusions, but I feel that we are gaining considerable information that will be very useful in our experiments from year to year.

Below are given tables that may interest many. In the report of the Physics department will be found some information on this subject.

Incubating Eggs by Hens.

Kind of Nest used.	No. of eggs set	No. of infertile eggs	No. of decayed eggs	No. of fully formed chicks dead in shell	No. of chicks hatched	Av. evaporation of those that hatched	Highest evaporation of any egg that hatched	Lowest evaporation of any egg hatched	Hatch of total set	Hatch of the fertile eggs
						%	%	%	%	%
On ground beneath trees..........	15	3	1	2	9	12.6	16.9	9.9	6.0	73†
On ground beneath artichokes....	15	2	....	1	12	9.6	12.9	7.5	8.0	91†
On ground beneath a large box...	15	4	....	......	11	10.17	17.7	7.0	73†	100
On ground in open field, some protection from long grass.........	15	2	....	2	11	11.4	14.2	8.2	73	84†
Total	60	11	1	5	43	10.9	....	......	71†	87†
On about six inches of moist earth in a box inside a building.......	15	2* 0	1	......	12	11.5	21.1	7.5	80	91†
" " "	15	3	3	......	9	10.92	14.4	8.6	60	75
" " "	15	1* 1†	1	......	12	11.23	13.80	8.40	80	91†
" " "	15	1* 1†	1	1	11	13.86	17.5	11.	73	84
Total......................	60	4* 5†	6	1	44	11.9	....	......	73†	85
On chaff in a box inside a building	15	2† 1*	7	......	6	11.91	16.3	10.5	40	50
On chaff in a box inside a building, box two feet above floor..	15	1*	2	......	12	12.7	16.7	10.4	80	85†
On chaff in a box inside building. The box about four inches above the floor. The floor of the box was not tight....................	15	1	1	2	11	12.95	15.3	10.4	73	78†
" " " C.......	15	1* 2†	1	1	10	15.58	16.40	11.40	66	83
" " "	15	3	1	3	8	19.4	27.1	10.2	53	66
Total.........................	60	6† 2*	5	6	41	15.15	....	......	68†	77†
Set in a box inside a building. Box lined with rubber cloth.........	15	1* 2	....	......	12	10.9	15.5	8.3	80	100

* Broken † Infertile

Incubating Eggs by Machines.

Machine	No of weighed eggs	No. of infertile eggs	No. of decayed eggs	No. of fully formed dead in shell	No. of chicks hatched	Average evaporation of the hatched eggs	Highest evaporation of the hatched eggs	Lowest evaporation of the hatched eggs	Percentage hatched of the selected eggs	Percentage hatched of the fertile selected eggs	Percentage hatched of the entire machine	Percentage hatched of fertile eggs of entire machine.
						%	%	%				
New Prairie State No. 1 Moisture Machine	30	4	3	6	17	9.1	13.7	5.9	56.6	65.4	61	70
	15	4	1	2	8	9.25	11.5	7.1	53.3	72.7	50	68
Model No. 2 Incubator..............	15	2	1	2	10	16.3	24.5	11.7	66	76.9	48	70
	15	3	....	2	10	16.12	18.6	12.7	66	83.3	51	75.4
Chatham Incubator No. 3, no moisture used	15	2	....	3	10	14.0	17.7	10.2	66	76.9	47	65
	15	2	1	1	11	13.81	15.7	12.3	73	84.6	54†	64.9
Open bottom No. 4 Prairie State.	15	4	1	2	8	15.37	19.2	11.9	53.3	72.7	45.7	65
	15	2	3	....	10	15.75	18.9	12.7	66	76.9	60.6	75
Chatham Incubator No. 5, moisture applied from the top.	15	1	1	3	10	12†	16.9	8.6	66	71.4	57.4	71
Chatham Incubator No. 5, moisture applied from the bottom......	15	1	1	1	12	11.1	21.2	6.9	80	85.7	61.7	76.3

These should not be considered experiments to determine the value of different makes of incubators.

There was some variation in the quality of the eggs used, especially Machines Nos. 1, 5 and 6. Machines Nos. 2, 3 and 4 had eggs very similar in quality.

Machines Nos. 1, 5 and 6 hatched chicks that in appearance were similar to those hatched by hens being large and very fluffy. This is especially true of machine No. 1.

The selected eggs were laid by trap-nest hens. All machines in these tests were operated at a temperature of about 101° on the eggs. The eggs were carefully weighed on the day they were set and on the 5th, 10th, 15th and 18th days of incubation.

The percentage evaporation was figured from the loss in weight for the eighteen days. In nearly all cases the selected eggs hatched better than the balance of the machine, probably due to the selected eggs being from better individuals. It will be noticed that there is a wide variation in the evaporation of the eggs hatched in the same machine even when laid by the same hen. Eggs laid by the same hen hatched under a wide variation in evaporation under different methods of incubation.

From these tests it would appear that hatchable eggs may be hatched between an evaporation of 27 per cent. and 5.9 per cent.

Individuality of Eggs Laid by the Same Hen in Evaporation and in Hatchability.

Hen's number.	How incubated.	Percentage evaporation.	Result.
5142	Machine No. 1	8.0	Hatched.
5142	“ “	8.2	Decayed.
5142	“ “	5.9	Hatched.
5142	“ “	6.6	Hatched.
5905	“ “	7.8	Fully formed, dead in shell.
5905	“ “	8.9	Fully formed, dead in shell.
5905	“ “	8.3	Hatched.
5905	“ “	8.4	Hatched.
234	Hen on ground	13.0	Hatched.
234	Machine No. 5	10.0	Hatched.
234	“ No. 6	8.3	Hatched.
234	Hen on raised nest	11.3	Hatched.
234	Hen on board and straw nest.	9.6	Chick about one-half formed.
234	Machine No. 4	17.8	Hatched.
234	“ No. 3	10.2	Hatched.
234	“ No. 2	14.1	Fully formed, dead in shell.
50	Hen on raised nest	23.5	Hatched.
50	Hen on raised nest	20.0	Fully formed, dead in shell.
50	Machine No. 3	13.6	Hatched.
50	Hen on raised nest	14.5	Fully formed, dead in shell.
50	Hen on raised nest	12.3	Hatched.
50	Hen on raised nest	14.2	Hatched.
50	Hen on ground	11.6	Hatched.
50	Hen on ground	7.3	Fully formed, dead in shell.
50	Hen on ground	7.2	Fully formed, dead in shell.
7099	Machine No. 5	19.7	Fully formed, dead in shell.
7099	“ No. 6	15.1	Hatched.
7099	Hen on raised nest	16.7	Hatched.
7099	Hen on board and straw nest.	14.3	Hatched.
7099	Hen on earth nest	21.1	Hatched.
7099	Machine No. 3	24.7	Fully formed, dead (a deformed chick).
7099	Machine No. 2	22.6	Hatched.
7099	Hen on rubber nest	15.5	Hatched.
7099	Hen on ground	12.9	Hatched.
7099	Machine No. 1	11.3	Hatched.
7099	Hen on ground	14.4	Hatched.
7099	Hen on ground indoors.	17.5	Hatched.
7099	Hen on ground indoors	15.1	Hatched.

I cannot state as to the vitality of the chicks so hatched at this time. I would prefer keeping the evaporation nearer to the hens which were set out of doors upon the ground. It appears to me that this is nearer nature, and the chicks so hatched did well in the majority of hatches. There was a large per cent. of carbonic acid gas under the hens in the air around the eggs. The temperature of the air was about 101° F., and the relative humidity was somewhat less than the air in the room.

REARING LATE HATCHED CHICKS.

For experimental purposes we ran incubators and set hens during the summer months. The chickens so hatched we wished to raise for two weeks at least, and after careful consideration of our conditions we decided to use only hens as brooders. We selected as a rearing ground a twenty acre corn field and used the hopper system of feeding. The corn field was considerable distance from the plant and no water was nearby, hence we made no pretence to water the chicks. I would not at present advocate not watering chicks, but I mention this fact in connection with the conditions under which the chicks were raised. The plan adopted was somewhat as follows: The broody hens were given chicks after dark. They were usually allowed to hatch two or three chickens previous to getting those from the machine. The next day they and the chicks were removed to coops in the corn field and the chicks were shut in the coop with the hens. A small hopper was placed inside each coop. The feed in the hopper was wheat and cracked corn. In some instances oatmeal was added, in others some commercial chick food, and in others bread crumbs. The hen and chicks were confined to the coop for from two to four days, depending upon how well the hen mothered the chicks. Usually about the third day the hen and chicks were released from the coop and allowed to run at large. A hopper containing about a bushel of wheat and some cracked corn was put down near the coop. The coops were placed near this hopper to the number of about six, or say, one hundred chicks to each hopper. The next hundred would be placed some distance away. The colonies rarely mixed and the chicks did remarkably well, as the figures below will show.

We had one lot of chicks taken from the same machine as those in the corn field, but grown in a run with large chickens. The ground in this had had chickens grown upon it for a number of years. These chicks were not disturbed much by the larger birds. When twenty-six days old the chicks in the corn field weighed 8.5 ounces each, while those in the old run average 3.25 ounces each.

When eight weeks old the chicks in the corn field weighed two pounds each, while those in old ground weighed 10.6 ounces each. The weights given were nearly the same for all lots so raised. We did not weigh every lot, but did weigh several with practically the same results. When four months old the cockerels raised in the corn field weighed five pounds each without food in the crop. The birds were not moved until the corn was cut and the field ploughed, or about November 1st. The large cockerels were then crate fed. While in the field there were two snow storms, one of which left the ground covered for nearly two days.

I consider to grow the best chickens with the least trouble that a cultivated hoe crop and hopper feeding are worthy of serious consideration.

The chicks when running in the field refused to eat beef scrap at the commencement and none was offered later.

One hen laid in twenty days after being put out with chicks. Nearly all the hens laid in reasonable time and their plumage was glossy.

FATTENING EXPERIMENTS.

In previous years we did some work in comparing the value of sour milk and whey as materials for wetting ground grains for feeding chickens. We conducted a limited number of experiments this year with both whey and sour milk. We have also conducted some experiments in the feeding of molasses.

We received from the Shredded Wheat Co., of Niagara Falls, some waste food, which I presume is largely broken biscuits and floor sweepings.

They wished us to test it as food for growing chickens. We used it in our fattening experiments along with ground wheat and bread. The bread used was waste material that comes from the ordinary household.

This year we fed a few chickens for one week only. The results of the experiments are given in the table below.

We have figured shredded wheat, bread and ground wheat to be worth each $1.40 per hundred pounds.

The grain mixtures are figured at $1.25 per hundred pounds, whey at four cents, and milk at ten cents per hundred pounds, and molasses at four cents per pound.

Testing Rations for Feeding Chickens. Period of Feeding Two Weeks.

Rations.	Number of birds.	Date of feeding.	Weight at beginning of experiment.	Weight at end of first weeks' feeding.	Weight at end of second weeks' feeding.	Pounds of grain consumed.	Pounds of grain to make one pound of gain.	Pounds of milk or milk substitute.	Cost of milk or milk substitute.	Cost of grain.	Total cost.	Cost of one pound of gain.
			lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	cts.	cts.	cts.	cts.
Shredded wheat and sour milk.	12	Sept. 29.	55½	64	70½	49	3.26	100	10.	68.6	78.6	5.24
Shredded wheat and sour milk.	12	Oct. 22..	51	59	61½	41	3.90	86	8.6	57.4	66.0	6.28
**Bread and sour milk	12	Oct. 22..	49	56	55	38	6.19	81	8.1	49.4	57.5	9.58
Bread and sour milk	12	Oct. 11..	52	58½	59½	42	5.60	87	8.7	54.6	63.3	8.44
Ground wheat and sour milk.	12	Oct. 11..	53½	60½	65½	56½	4.73	104	10.4	73.4	83.5	6.96
Ground wheat ane sour milk.	12	Oct. 22..	54½	60	63	43½	4.57	87	8.7	56.5	65.2	6.86
*Ground wheat, molasses and sour milk.....	12	Oct. 22..	50	59	60	39	3.90	†86	28.1	50.7	78.8	7.88
Equal parts shredded wheat and corn meal mixed with molasses and sour milk...........	12	Sept. 30.	45	53¾	60½	39	2.51	‡79½	29.4	48.7	78.1	5.04
Equal parts shredded wheat and corn meal mixed with molasses and sour milk	12	Sept. 29.	52½	62½	66	52½	3.9	92	9.2	65.6	74.8	5.54

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* Four birds in this experiment developed feather pulling.

** Droppings were green last two days of experiment.

† Including 5 lbs. molasses costing 20 cents.

‡ Including 5½ lbs. molasses costing 22 cents.

Test Ration for Fleshing Chickens. Period of Feeding, One Week.

Rations	Number of birds	Date of feeding	Weight at beginning of experiment.	Wt at end of first weeks feeding	Pounds of grain consumed	Pounds of grain to make one pound of gain	Pounds of milk or milk substitute	Cost of milk or milk substitute	Cost of grain	Total cost	Cost of one pound of gain
			lbs.	lbs.	lbs.	lbs.	lbs.	cts.	cts.	cts.	cts.
One-third shredded wheat, cornmeal and oatmeal, whey and molasses...........	12	Oct.18	58½	67	21	2.47	*48½	14.	26.2	40.2	4.73
One-third shredded wheat, cornmeal oatmeal and sour milk	12	"	60	69	21	2.33	42	4.2	26.2	30.4	3.38
One-third shredded wheat, cornmeal, oatmeal mixed with whey.............	12	"	54	62½	20½	2.73	42	2	25.7	27.7	3.68
Shredded wheat mixed with whey..	12	Oct. 8	49½	56	23½	3.61	44	2	32.	34.9	5.36
Half shredded wheat, cornmeal, molasses and sour milk..........	12	Oct. 7	53	60	20	†2.85	†41	13.9	28.	41.9	5.98

* Including three pounds of molasses costing 12 cents.

† Including two and a half pounds of molasses costing 10 cents.

Notes on Feeding Experiments.

It will be noticed that a mixture of grain gave better results than any single food. We have had similar results in previous years, and generally speaking I would recommend a mixed ration in preference to one composed of any single grain.

Molasses has not so far proved to be an economical food as to cost or number of pounds of gain produced. It also appeared to induce feather pulling.

Whey did not give as good results as milk, yet is a food worth considering. This year's tests and last year's tests both indicate that whey has considerable value.

Shredded wheat made a better showing than either bread or ground wheat. The chickens feed on bread soon tire of the ration and in one instance develop indigestion. Ground wheat was relished better for the entire period of feeding than was shredded wheat, but did not make as economical gains.

WEED SEEDS AS FEED FOR POULTRY.

Through the kindness of the King Elevator Co., of Port Arthur, and the Seed Commissioner at Ottawa, I secured a sack of ground weed seeds, also a sample of the weeds from which the ground feed was prepared. To test the value of this food for poultry we selected some twenty individual, healthy birds. The birds were weighed individually and divided into five groups of four each. One group was fed ground weed seeds and milk; another was fed ground weed seeds and water; another was fed ground weed seeds and whey; another was fed half cornmeal and half weed seeds and sour milk; and another was fed half refuse shredded wheat biscuit and half weed seeds mixed with milk. The birds absolutely refused to eat any of the rations, with the exception of the last mentioned ration. We tried in many ways to get them to eat the food, but failed entirely.

To find out whether the weed seeds would make a food regardless of their palatability, we took sixteen birds and crammed them with weed seeds mixed with water. The results were that the birds appeared to be unable to digest the food. Apparently there are some seeds which are indigestible, so far as chickens are concerned. If the crops were moderately well filled it would take almost 36 hours to empty them; so that we found to feed them twice a day we could give but very small quantities. The food did not seem to satisfy the birds at all; or, in other words, when they were put back in the coops they would whine and be constantly looking for something to eat. They acted as if they were starving to death. In fact, after feeding one week we found it necessary, in order to save the birds' lives, to change the method of feeding entirely. Below is given a table which will show the gains and losses of the birds as fed upon weed seeds and shredded wheat, and also when the birds were feeding upon weed seeds and changed to a fairly changed to a faily palatable ration:

Table showing the gains and losses of the birds as fed upon weed seeds and shredded wheat, also when the birds were fed upon weed seeds and changed to a fairly palatable ration:

No. of Birds.	Date of Comencement.	Weeds, Seeds and Water.				Weight at end of ten days feeding cornmea oatmeal, shredded wheat and sour milk.		
		Weight at Commencement.		Weight at end of first week. (Crammed)				
		lbs.	oz.	lbs.	oz.	lbs.	oz.	
1	Sept. 29	3	8	3	2¾	3	6¾	This bird was very sick after second day and never fully recovered.
2	"	3	4½	2	15½	4	0	
3	"	3	9¼	3	5½	4	5½	All 16 birds were very dull looking, extremely thin and some had food in crop 36 hours after cramming.
4	"	3	5	3	0	4	4¼	
5	"	4	2¾	3	12	5	1¼	
6	"	2	13¾	2	11	3	11½	
7	"	8	8¾	3	6½	4	9½	
8	"	2	14½	2	11½	3	11½	
9	"	3	5¾	3	2¼	3	4½	Very sick, did not eat for 2 days after cramming.
10	"	3	12¼	3	5½	4	7½	
11	"	3	10	3	5	4	3¾	
12	"	3	10¼	3	4¾	4	0¾	
13	"	3	9¼	3	4	4	0¾	
14	"	2	14	2	9½	3	6	
15	"	3	14¾	3	0¾	4	0¾	
16	"	4	2½	3	13¼	4	12¼	
	Shredded Wheat and Weed Seeds.					2nd week.		3rd week.
17	"	3	0¾	3	5	3	7¼	3 10¾
18	"	3	7¼	3	6¾	3	5	3 9¾
19	"	3	0¼	3	2	3	9¾	4 2¾
20	"	3	15¼	4	2	4	7¼	5 2¼

Testing Three Varieties of Ducks for Growth.

This experiment was begun July 28th and continued for nine weeks. It might have been more advantageous to have conducted the experiment earlier in the season, but owing to pressure of other work we were unable to make the test satisfactorily at an earlier date. It would not be well to draw conclusions from this test. Another year we shall try to have one or more similar tests.

It will be noticed that the Indian Runners were killed earlier than the others, which was due to the fact that they feathered faster and therefore were ready for the market earlier. The parties to whom we shipped the Indian Runners complained of their small size and their lack of meat.

Name of Breed.	No. of Birds.	Wt. at commencement.		Wt. at four weeks.	Wt. at eight weeks.	Wt. at nine weeks.	Food consumed.	Lbs. of grain to make 1 lb. gain.	Wt. of four largest nine weeks.
		lbs.	oz.	lbs.	lbs.	lbs.	lbs.		lbs.
Pekins	15	2	7	23	62½	71½	188	2.6+	22
Cayugas	13	1	13	19	50½	56	169¾	3.12	17½
Indian Runners	15	1	13	18	50	*	148¼	3.0—	14

*Killed at eight weeks.

The staple food fed was a mash composed of four parts cornmeal, three parts oatmeal, one part shorts, to which was added 25 per cent. meat meal. The mash was mixed with cold water. Sprouted wheat and bread and milk were fed once daily, being last feed at night. The ducks were fed four times daily until six weeks of age, then three times daily.

Geese.

We had much better success with geese this year than last. Our geese have no water except what is given for drink. Most of the geese laid eggs which hatched well, but one goose in particular never laid a fertile egg. I believe, however, we raised an average crop of goslings. Some of these we killed and dressed at nine weeks of age. When dressed they weighed about ten pounds each. I cannot say whether the market for these goods is limited or not, but judging from the reports we received from consumers, geese at this age are good eating.

We succeeded in rearing three goslings from a pair of wild geese. The old geese came from Winnipeg, and I understood from the party who sent them to us that they were three years old. The goose laid four eggs and hatched four goslings. One gosling died during the second week, the others grew well. The wild goslings present a very fine appearance when dressed, the breast, especially, being well developed.

I wish to thank both yourself and the Minister of Agriculture for the kindly support given me in the work of the Poultry department.

Respectfully submitted,

W. R. GRAHAM.

PART XVI.

THE LECTURER IN APICULTURE.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to present herewith my report as Lecturer on Apiculture. The usual course of eighteen lectures and outdoor demonstrations with bees was given.

In producing comb honey one of the chief labors of a colony is the making of wax. To manufacture this a high temperature is required, and cool weather quickly affects the work in the supers. This year, out of thirty colonies that were run for comb honey, I chose ten of average strength and tried to give them some protection that would keep up a high temperature. They were packed in chaff hives just as if for winter. Comb honey supers were placed upon the brood chambers and covered up with six inches of shavings.

The honey flow this year was so scanty, that little difference could be discerned between the two lots of colonies, but what there was favored the protected hives. More bees were to be found in their supers on cool days and the sections at the sides of the supers were better filled; but in none of the hives, on account of the poor season, were there any first-class sections. There were no swarms from either lot.

In September last year sixteen colonies were prepared for winter as follows: The hives were eight frame Langstroth contracted to seven frames and fed until the combs were full, except where a few square inches of comb were occupied with brood. Inverted queen excluders were placed over the combs and on top of them well propolized quilts. Four hives were then placed together, side by side, as closely as possible, first putting a double thickness of cotton batting between the hives, so that no air could get between them. The covers of this row of hives were removed and a layer of cotton batting placed on top of them, and then upon that a sheet of mineral wool, and on top of this another row of hives treated exactly like the first. Then a third row and a fourth. But there was neither cotton batting nor mineral wool on top of the last row. Twelve inches of shaving were placed on top of the pile of hives, and on all sides except in front, which was left exposed to the weather. The shavings were kept in place and protected from the weather by inch sheeting, and on the roof by tar felt besides. The entrances of all but the bottom row were contracted to two inches, in order that the bottom board, which was the cover of the hive beneath it, might not become cold. The contracted entrances were cleared of dead bees by means of a bent wire twice during the winter.

The object aimed at was to pack the hives in the cheapest manner possible, to utilize the animal heat from the hives, and to make the bees fly during the winter.

The hives were protected by a high woods on the northwest, and the hive entrances faced the southeast. The winter was abnormally mild, and the sun, warming up the face of the hives which had no protection, caused the bees to fly a great deal, perhaps too much. The hives were opened and examined the first of May. There did not seem to be any difference between the interior and exterior ones, so far as the condition of the stores and combs went, there being no mold on them. All the hives showed evidences of winter laying, and two of the interior colonies were dead from starvation from this cause. This, however, occurred to a greater or less extent in those wintered in the ordinary chaff hives, and was attributed to the very mild winter.

Respectfully submitted,

H. H. ROWSOME.

PART XVII.

THE DIRECTOR OF HOME ECONOMICS.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to submit herewith my third annual report on the work of the Home Economics Department for the year 1906.

THE YEAR'S WORK.

The Home Economics Department has been almost wholly occupied during the past year with the instruction of students. As hitherto, two main objects have been held in view,—the one, by means of the Homemaker course, the Short courses in domestic science, and Optional Courses, to help the young women of our country in their business of homemaking; the other, to train teachers of domestic science who are expected to further the interests of Canadian homes by developing and deepening our schoolgirls' interest in the problems and work of their homes. The effort to provide an adequate Housekeeper course for women who desire training for institutional housekeeping continues. No great changes have been made during the year, but it is hoped that those made will strengthen weak points and improve the different courses.

THE COURSES OF STUDY.

The different courses are pretty fully outlined in the College calendar. It will therefore be unnecessary to specify each subject studied.

1. *The Normal Course* continues two years. The Junior Class devotes its time chiefly to acquiring accurate and practical knowledge of household affairs, to the study of elementary chemistry and physiology, psychology, history of education, general methods of teaching, school accounts, and University first-year English. Twelve students entered this class in September, 1905. All passed the examinations last June, and ten are now in attendance as Senior Normal students. Nine entered the Junior Normal class last September.

The Senior Normal class studies further science work and household affairs and also University second year English, but the major portion of their time is devoted to the careful study of the problems of teaching domestic science and to the observation and practice of teaching. Each student is required to plan and carry out three demonstration lectures in cookery, and to observe and report on many others. Each is required to observe and report on many domestic science lessons taught to public school classes and must also teach a certain number of public school lessons. This class is fortunate in having actual public and high school classes to teach, and also in being permitted to observe the domestic science teaching which is carried on in the Macdonald Consolidated School and in the Guelph Central School. The practice-teaching is carefully supervised and is the most valuable part of the Normal student's training. Three practice-classes are sent up from the Guelph public schools and two from the High School. They are not so large as at first, when Guelph employed no domestic science teacher, but are satisfactory for our purpose since they provide children of different ages. Fifteen students passed into this class in September, 1905. Twelve passed the final examination in June, 1906, and have received the Macdonald Institute Teacher's Certificate in Domestic Science. Ten students entered this class last September.

Certain experienced public school teachers are admitted to the Senior Normal class. They are given credit for previous science and Normal training, they are not required to take the English, and their classes are arranged to allow them to make up the remaining Junior Year subjects. They are called One Year Normal Students, and their course is a heavy one. For experienced public school teachers who have had good practical experience in household affairs and who have studied elementary chemistry, the course is very satisfactory. Many of our best domestic science teachers are of this class, but their success is largely due to the home training which taught them something of the difficulties and resources of the homemaker. The teacher who has spent most of her life between school and teacher's desk is apt to find one year much too short time in which to gain the necessary practical experience. The teacher whose experience consists chiefly of the training of a domestic science school is at a disadvantage before children whose mothers expect her to be a mine of information on all household matters. We would not discourage teacher-students, but they should be warned of possible disappointment. Last year and this year we were unable to accept all the applications for this course owing to the limited amount of Normal course instruction and practice-teaching available. Those chosen last year formed a strong class, and this year's class promises well. Eight entered this course in September, 1905. Seven passed the final examinations in June, 1906, and have received the Macdonald Institute Teacher's Certificate in Domestic Science. Eight students entered this class last September.

Every effort is made to train each Normal student to study the problems of her chosen work, to use the subject as a means of developing intellectual power in children, and to teach good Elementary Domestic Science. We believe this course has been strengthened by decreasing the number in the class, which gives each student more practice teaching and more careful instruction in methods, and by adding some practice in School Accounts. The addition of University first and second year English will enable our graduates to secure a better standing if they wish to study further in other schools.

2. *The Homemaker Course* continues one year, but may be broadened and extended over two years. It is planned for girls who look forward to living at home, and desire to prepare for homemaker's duties. It is especially planned for girls who have had little practical experience of household affairs. From the very nature of the work the homemaker is thrown much upon her own reources, and should be capable of dealing intelligently with difficulties as they arise. Macdonald Institute cannot transform a girl in her teens into an expert housekeeper, or develop abnormal wisdom in her, but the course is certainly beneficial to the girls who are in earnest. Older students also find the systematic study of familiar things very profitable. This course aims to give the girls, by means of many lessons and much individual practice work, a good elementary knowledge of the different branches of ordinary household work; to develop their interest in some of the housekeeper's administrative problems, and above all to induce them to think about the greater questions of sound bodies, wholesome dwellings and real homes. The average

student is inexperienced in the ordinary work of a household. She is therefore taught the best methods and processes of elementary cookery and sewing, housework, laundry, etc., and she is required to do a great deal of practical work. Lectures are given them on Foods, Sanitation, Home Nursing, Physiology, and lessons in English and the keeping of household accounts. Required sewing work includes plain hand sewing, undergarment and shirtwaist making, but students proficient in any or all of them before entrance are permitted to substitute a more advanced sewing class or another optional subject. After a certain amount of instruction in the class rooms, each student is required to keep house in the apartment for a week, during which time no other work is required of her. She enters and works with her predecessor one whole day before assuming full responsibility. She is given money and is expected to do the marketing, to cook and serve the meals for the two members of the staff who live there, to wash the dishes, keep the rooms clean, and finally to render account of the expenditure. This has become the most popular feature of the course, and is certainly valuable practice in household administration.

It may be necessary to explain that no attempt is made to teach fancy cookery or elaborate processes in any branch of the work, but every effort is made to give each girl a thorough foundation which she may develop into skill in her own home. It is gratifying to report the increasing interest in the course and the approval of it so frequently expressed by visiting fathers.

The course has been strengthened this year by adding lessons in English and in keeping household accounts. Both are sadly needed by the average student of the class. The practical housework has been greatly improved by the careful supervision and inspection rendered possible by more teaching service. When this work was started in the first year considerable opposition was made to it because of the feeling that it was "janitor's work." This has died away, and the warm approval of this practice expressed in many quarters is helping to develop the more sensible attitude that "it is well for a woman to know how the work of a house should be done."

Twenty-five entered this class in September, 1905. Fifteen passed the final examinations and received the Institute Homemaker Diploma. The present class numbers twenty-three.

The Short Course in Domestic Science, which continues three months and is repeated three times each year, continues popular. The work is chiefly practical and is thorough as far as it goes. No examinations are held in connection with this course, but the majority of the students do faithful work. A large number, especially in the Winter term, come from country homes and are eager to make the most of the opportunities offered by the different departments of the College. In consequence, each year we have had a double Short course class in the Winter term, and shall have another next January.

Each student is allowed to choose one optional subject in addition to the required work, and usually finds something to her taste in the varied list of Millinery, English, Horticulture, Dairying, Poultry Raising, Carpentry, Woodcarving, etc. The required work includes plain sewing, but a student already proficient in it is permitted to substitute a more advanced sewing or a second optional subject.

There were in attendance this year:

Winter term, January to March.........	48
Spring term, April to June.........	15
Autumn term, September to December......	18

4. *The Housekeeper Course* is a professional one, offered to mature women who have had a good deal of housekeeping experience at home and desire training to fit themselves for housekeeper positions in larger institutions. They are expected to have good executive ability before entering and the course aims to give them correct standards in the preparation of food, housework, sanitation, etc., and to train their executive ability along the lines of institution requirements. They are required to take the same science and practical work as the Normal students, but instead of studying school equipments and methods of teaching, they study large kitchen equipments and methods of administration for large buildings, such as our own residences for men and for women. Each student is in turn required to act for a month at a time as Market Woman, Loan Clerk, Stockroom Clerk and Classroom Housekeeper, doing the clerical work of each office. They will be required to supervise the apartment housekepers, and to investigate, with Miss Tennant's assistance, the working of Macdonald Hall. Part of this investigation will consist of becoming a dining-room maid, a housemaid and a kitchen maid for a short time in order to gain accurate and intimate knowledge of the duties and difficulties of each position. The present course is the outcome of a demand both from students and institutions, and it is hoped that each year will see it greatly improved. Judging from the letters received asking for housekeepers, there are many institutions in need of trained women.

Four students entered this class in September, 1904. Three passed the final examinations in June, 1906, and have received the Macdonald Institute Housekeeper Certificate. Five entered the Junior class in September, 1905. Four passed into the Senior class by examination last June; one entered the Senior class by transfer from the Normal class and one by virtue of graduation from the Homemaker class; making six students in the present Senior Housekeeping class.

When a graduate of this class has completed six months of successful work as housekeeper in an institution, she is entitled to the Professional Housekeeper Certificate.

5. *Optional Courses* are made up of subjects chosen from the regular courses and from the list of optional subjects. The number of these students is lessening owing to the fact that they cannot be accepted until the beginning of the term, when it is known what vacancies are left by the regular students. There are none in residence at present. Several optional students have taken full time courses, but the majority are Guelph girls coming for but one or two subjects. There were in the Winter term seven Optional students; in the spring term, four; and in the present term there are six.

OPTIONAL SUBJECTS.

The Optional subjects are Millinery, Plain Sewing, Undergarments, Shirtwaists, Skirts, Dressmaking, Dress Drafting and Fitting, English, Diarying, Horticulture, Carpentry Woodcarving, Metal-work, Poultry Raising and various lecture subjects. The sewing classes are always popular, but others secure large classes, notably the Dairying in the Winter term. There is always a Woodcarving class and the satisfactory course in flower and vegetable culture always attracts a good class.

STUDENT WORKERS.

This is a new feature which enables a girl to pay for a Short Course with work instead of cash. By an arrangement with the housekeeper in Macdonald Hall, we are able to advertise in the year's College Calendar the following:

Terms upon which certain Students may Defray the Cost of the Short Course in Domestic Science at Macdonald Hall.

1. These terms can be offered to a limited number only.

2. The candidate agrees to give Macdonald Hall four months' service as waitress or dining-room girl, submitting to the same rules and regulations as the regular dining-room girls.

3. In return for the above service the candidate will receive one term's tuition in the Macdonald Institute Short Course in Domestic Science, and also be given free board and lodging in Macdonald Hall. She will be given all student privileges, and will submit to all rules governing the students.

4. During both periods of service and tuition the candidate will be assigned a share in a double-room among the students in Macdonald Hall.

5. The candidates will be expected to provide the same room furnishings as the regular students. (See page 88 of Calendar.)

6. The term of tuition may be taken any term within one year after the service is given.

7. The contract may be transferred to another person, subject to the approval of the Director of the Department.

The above terms are agreed to

By ....

Date ....

There are now three student workers who began their term of service on September 1st, and who will enter the January Short Course. Three more are ready to take over the service in January, and the arrangement so far has been very satisfactory. It is pleasant to note that Macdonald Institute is open to at least a few of the girls who are willing to work for its benefits.

SPECIAL LECTURES.

The following series of six special lectures in connection with the marketing course was again carried out successfully:—

Meat	Professor Day
Poultry and Eggs	Mr. Graham
Cereals	Professor Harcourt
Fruit and Vegetables	Professor Hutt
Canned Foods	Professor Harrison

By the kindness of Professor Harcourt, who arranged the excursions, the Senior Chemistry Class was last spring taken through the Goldie Flour Mills at Guelph, and recently a trip to Berlin was arranged. They visited the Beet Sugar factory, the Merchants' Rubber Company, the J. T. Shantz and Sons' Button factory, and the Williams, Greene & Rome factory. Everywhere the manufacturers tried to satisfy the curiosity of the girls, and were most kind. The welfare work being carried on in the Williams, Greene and Rome factory was of especial interest. The girls will long remember the dainty cup of tea which was served in the pleasant lunch room of the employees after a long tiring day, and they will watch with keen interest for the further development and spread of the ideas which are there being worked out.

The cooking exhibit of the Fergus Fair and the cooking and sewing exhibit of the Guelph Exhibition were this year judged by members of our staff. It was noted that the bread exhibited by the children of Guelph was a much more creditable display than that exhibited by the adults. Apparently the domestic science instruction in the Guelph public schools is bearing fruit.

At the request of the Provincial Secretary of Ontario, I last spring and summer visited various Ontario Asylums and United States institutions. I went to the Toronto, London, Hamilton and Kingston Asylums; New York State Hospitals in Ogdensburg, Ward's Island, New York, Binghamton, and Buffalo; the Johns Hopkins Hospital, Baltimore; the Butler Hospital, Providence, and Simmons College, Boston. The visits were illuminating and highly instructive. They were of value to the Macdonald Institute work because of the information gained about equipment and the conditions which must be faced by institution housekeepers.

This department was represented at the Ontario Educational Association last Easter by Miss Greenwood, Miss Givin, and myself.

RECIPIENTS OF THE TEACHER'S CERTIFICATE IN DOMESTIC SCIENCE.

A. Graduates of the Two-year Normal Class.

1.	Bickell, Ethel B.	Toronto.
2.	Cameron, Margaret I.	Durham.
3.	Card, Mae	Wicklow.
4.	Davis, Maud R.	Toronto.
5.	DeLury, Abbie	Manilla.
6.	Fleming, Annie W.	Owen Sound.
7.	Gardner, Ruth V.	Niagara Falls.
8.	McCaig, Katherine T.	Collingwood.
9.	McDunnough, Helen	Sorel, Que.
10.	McMurchie, Helen	Harriston.
11.	Robertson, Agnes	Toronto.
12.	Shaw, Pauline	Penobsquis, N.B.

B. Graduates of the One-year Normal Class.

1.	Bartlett, Katherine	St. John, N.B.
2.	Bodwell, Ethel S.	Ingersoll.
3.	Cleland, Bessie D.	Ravenshoe.
4.	Hamilton, Joan	Attwood.
5.	Penfold, Maud	Guelph.
6.	Prichard, Frances	Hampton, N.B.
7.	White, Lila K. G.	Woodstock.

C. Graduates of the Normal Domestic Science after passing supplementary examinations.

1.	Marshall, Frank	Kenora.
2.	Pease, Isabel	Toronto.

RECIPIENTS OF THE HOUSEKEEPER CERTIFICATE.

1.	Dunbrack, Mrs. Ethel	St. John, N.B.
2.	McKenzie, Jean M.	Galt.
3.	Shand, Erie	Port Dover.

RECIPIENTS OF THE HOMEMAKER DIPLOMA.

1.	Algie, Constance	Alton.
2.	Algie, Cora	Alton.
3.	Beamer, Bertha	Grimsby.
4.	Carter, Edith	St. John, N.B.
5.	Fraleigh, Emma	St. Marys.
6.	Greening, Edna	Hamilton.
7.	Holman, Gladys	Summerside, P.E.I.
8.	McLellan, Lucy	Ft. Saskatchewan, A.
9.	Malcolm, Madge	Hamilton.
10.	Mennie, Mattie	Fergus.
11.	Mortimer, Nellie	Honeywood.
12.	Ross, Mary Effie	Embro.
13.	Thompson, Louise R.	Heathcote.
14.	Thorne, Elsie M.	Toronto.
15.	Weir, Mary B.	Montreal, Que.

SUMMARY OF ATTENDANCE.

1903-1906.

Total attendance	434
Number registered twice, having taken two different courses	24
Non-professional students	352
Professional students	82

January to June, completing the College year of 1905-1906.

Senior Normal Students:	
Enrolled September, 1904	15
Enrolled September, 1905	8
Junior Normal Students	12
Senior Housekeeper Students	3
Junior Housekeeper Students	5
Homemaker Students	24
Short Course in Domestic Science:	
Winter Term Students	48
Spring Term Students	15
Optional Students:	
Six Months	2
Three Months	8
Public and High School classes	96
	236

September to December, opening the College year of 1906-1907.

Senior Normal Students:	
Enrolled September, 1905	10
Enrolled September, 1906	8
Junior Normal Students	9
Senior Housekeeper Students	6
Junior Housekeeper Students	5
Homemaker Students	23
Short Course in Domestic Science: Students	18
Optional Students	6
Public and High School classes	68
	153

Students counted in both of the above lists:—	
In Two-year courses	15
Short Course Students of last year, now in Homemaker Class	1
Homemaker Student of last year, now in Housekeeper class	1
Public School classes	28
	45

Total number of students in 1906	344

STAFF CHANGES.

Miss Speller resigned the domestic art work last June. Some difficulty was experienced in finding a satisfactory teacher, but finally Miss Greist, graduate of Pratt Institute and of Teachers' College training, was chosen. She has been in charge since September and is doing good work.

Miss Holland resigned suddenly in September. Her place is now filled by Miss Ferguson, one of our own graduates.

Miss Bigelow, who gave us efficient Laundry teaching from September, 1905, to June of this year in return for an optional course, board and lodging, was added to the permanent staff in September. She has charge of the laundry and house-practice and gives most of the Household Administration lectures. The house-practice was organized and up to September conducted by myself, but the work is individual, and its rapid development made adequate inspection impossible. Miss Bigelow's employment makes possible the careful oversight which is so necessary, her time is very fully occupied, and the work is in a much more satisfactory condition.

GRADUATE EMPLOYMENT.

It is of interest to note what has become of the 49 professional graduates of this department.

Employed in Home Economics Work	25
Employed in other teaching	8
Seek no employment	9
Deceased	1
Unemployed	6

Of those occupied in Home Economics work, one is in the Ottawa Normal School; one in the Guelph, and another in a New Brunswick Consolidated School; one in Vancouver Public Schools; eight in Ontario Public Schools; one in Macdonald Institute; one in the Kingston Y.W.C.A.; two in private schools; one in the Hamilton Hospital as dietician; one giving lectures in several hospitals; two in Women's Institute work in Canada and one in Women's Institute work in North Carolina; four are housekeepers in large institutions and one is Bread Experimentalist for the Ogilvie Milling Company in Montreal.

EQUIPMENT, ETC.

Our equipment has been improved by the addition of several fine physiological models, which contribute greatly to the physiology and home nursing work. These should be added to until we have a thoroughly illustrative collection.

The work of the Sewing department would be greatly facilitated by the addition of illustrative material which can be used to explain the structure of cloth and the combination of color, and a set of drawers for students' work.

The cork matting recently laid in the corridors is a great improvement and will be especially appreciated next June when the Farmers' Institute excursions are visiting us.

The time is coming to consider the advisability of offering a sewing course which will devote most of a student's time to sewing with electives in other branches in much the same way as the present Short Course devotes most of the time to Cookery and laundry with sewing electives. The demand for it is coming from several directions, but especially from old students who would like to return principally for Sewing. It is possible that by offering such a course in the spring and fall terms, the attendance for the year would be more evenly distributed over the three terms than it has been hitherto.

I beg to acknowledge the valuable assistance given to this department by many of the other departments.

Respectfully submitted,

MARY URIE WATSON.

PART XVIII.

THE PROFESSOR OF MANUAL TRAINING.

To the President of the Ontario Agricultural College:

SIR:—I have the honour to submit to you the third annual report on the work of the Manual Training Department.

Through your generous consideration I was privileged last summer to take two months' leave of absence to visit Britain, and I take this occasion to thank you sincerely for the opportunity afforded me to recruit my health, which had for some time been failing. While there I visited many educational centres,—London, Liverpool, Manchester, Nottingham, Leicester, Tamworth, Birmingham, and Cardiff—having schools and colleges of different types, gathering much information respecting buildings, equipments, courses of study and general organization of Manual Training and Technical Instruction.

Your letter of introduction to Dr. Peterson, President of McGill University, Montreal, secured for me permission to inspect the mechanical departments of that institution. These impressed me as being the best equipped laboratories I have ever seen.

In my last report I pointed out the growing importance of the work and the urgent necessity of better accommodation for its effective progress. Since that time the erection of a handsome building has been undertaken. This is now practically completed, and within a few weeks we hope to have it thoroughly equipped and ready for occupation. It only remains for me to express the hope that the increased facilities which its possession provides, will add to the reputation of the College and increase the already large benefits derived by the students.

The building is a two storied structure of red pressed brick on a limestone foundation, the roof being of slate. It is undoubtedly one of the finest on the campus, and reflects great credit on both architect and builder. The predominating lines are vertical, relieved somewhat by the segmental discharging arches of the upper windows in the piers and the arched copings. It is well proportioned, and on the whole a very pleasing structure, being 146 feet long and 64 feet wide.

The ground and first floors in the south-east wing are occupied by Mr. Crawford for carpentry work. The basement immediately under contains the Farm smithy, the painter's workshop and a room for storing lumber.

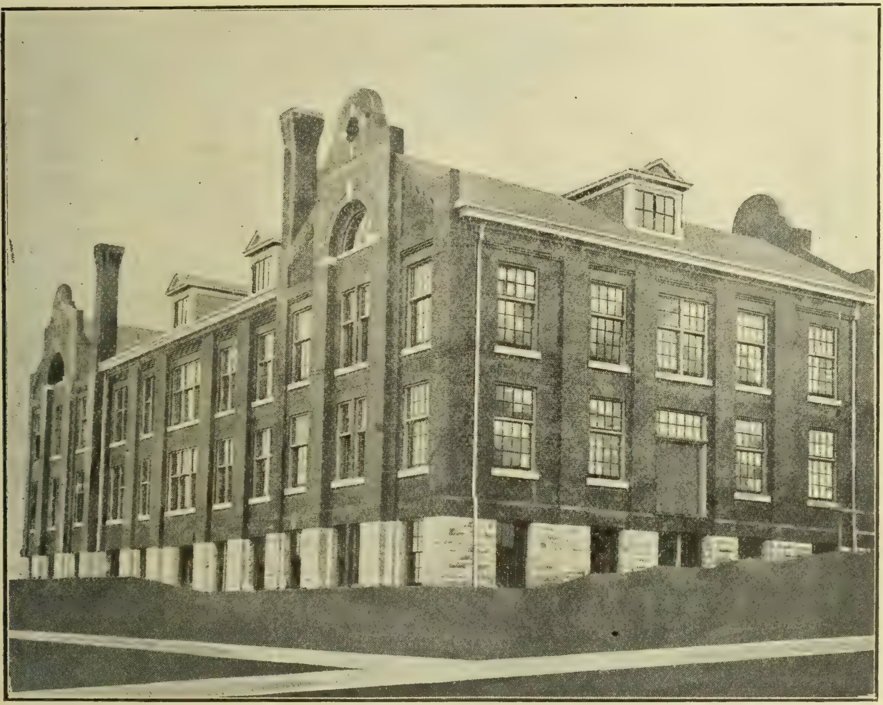
The north-west end is devoted to Manual Training. In the basement of this wing is the Forge room fitted with ten Down Draft forges connected with a blower and an exhaust fan and power driven. In addition it is equipped with anvils, swage blocks, and all necessary tools and appliances. Conveniently arranged and closely adjacent are the coal-bin, store-room and offices.

The machine shop is situated on the ground floor and contains two screw cutting Lathes, Power Drill, Power Hacksaw and benches for chipping, filign and fitting, offices and store-rooms. The rooms on the first floor are designed for Drafting and Primary Constructive work. The basement of the central portion provides accommodation for the storage of farm machinery and implements. On the ground floor and immediately over, is Machinery Hall. Above this on the first floor is the Woodworking room.

Machinery Hall has three gasoline engines of six, four and a half, and two h.p. respectively; and will also contain the most modern farm machinery and agricultural implements, separate parts of the same machines and engines to be used for demonstration purposes; a large number of implements, machinery and domestic utensils showing the progress and development of farm appliances from the earliest pioneering days. The Hon. Nelson Monteith, Minister of Agriculture, has already purchased an excellent nucleus for the collection.

The woodworking room will be furnished with twenty benches, a wood-lathe, grindstone, and a full equipment of hand tools.

As details of the courses offered by this department appear in the Calendar, and have also been outlined in previous reports, I shall here advert only to that portion of the work which, owing to the lack of accommodation and other facilities, has not yet been undertaken, namely, Farm Mechanics.

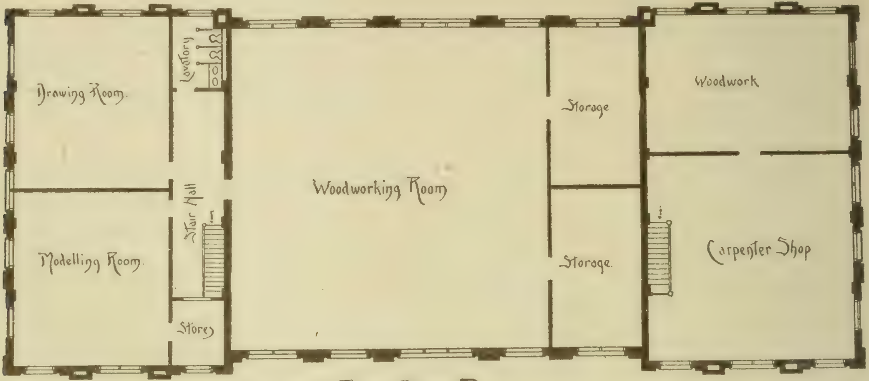


Building for Farm Mechanics.

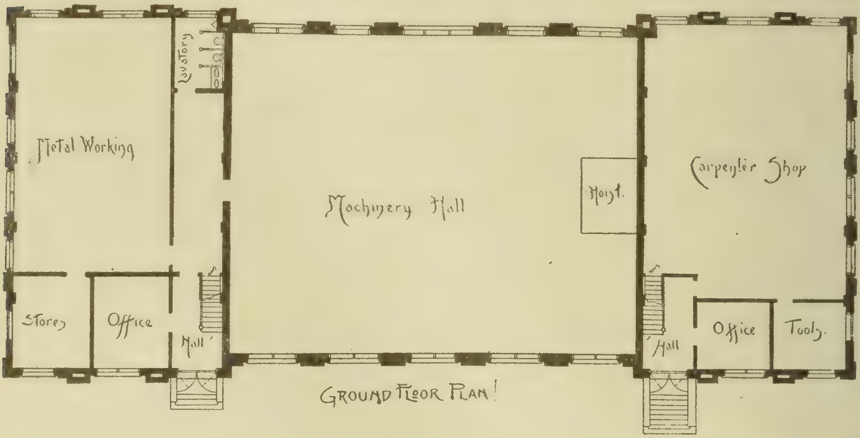
To conduct this branch in such a manner as will benefit the student and supplement the general work of the College, a further increase in the staff will be necessary before the additional subject can be taken with the greatest effect. The work of the department can never be distributed among two men without sacrificing one of the courses already carried on:—Normal, Nature Study correlated work, or the optional courses.

In the Farm Mechanics Course there will be no attempt to give the students a technical training in any of the mechanic arts, but it is deemed expedient to impart the fundamental principles of mechanics underlying and affecting farm implements and machinery with reference to their construction, operation, adaptability, efficiency and durability; the effect of adjustment and condition of wearing surfaces and edges on draft, and simple repairs.

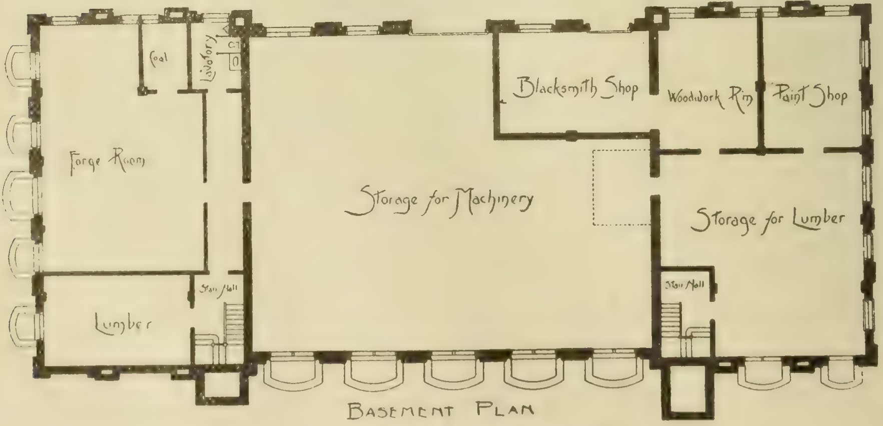
The course will treat on ploughs, harrows, cultivators, seeders, harvesters, mowers, and self-binders, with special reference to putting and keeping them in adjustment and working condition; detaching parts of farm implements and farm machinery, including grinders, pumps, fanning mills and gasoline engines, etc.; assembling and fixing of parts, testing and getting machines into working order.



FIRST FLOOR PLAN.



GROUND FLOOR PLAN.



BASEMENT PLAN

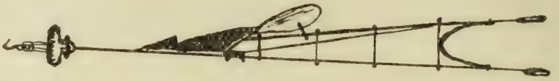
BUILDING FOR FARM MECHANICS.

By means of lectures, models, drawing, laboratory work and demonstrations, we hope to show the young farmer how the simple principles of mechanics enter in curiously different ways into his farming practices; that however able he may be as a chemist, physicist or botanist, there is knowledge which cannot be learned through books alone and which can only be acquired through actual contact. He must get to know the properties of materials by chipping and filing, paring and planing; to understand the construction of a plough, its draft and effect upon different kinds of soils, by handling, and learn how to manage it so as to cut a straight furrow, by actual practice. This kind of knowledge must not be something apart from our life and work, but a part and parcel of it. The man who shirks the practical work of the course will lose a great deal more than he is aware of. To effect this object he must perform many simple mechanical experiments and endeavor to overcome any contempt he may have for simple manual operations. In this way he learns much more than from mere theory alone, for through touch he acquires the inwardness of things, and among other things obtains a valuable knowledge of the errors he is apt to make from assuming that he knows without having proved through actual experience; hence, doing stimulates knowing.

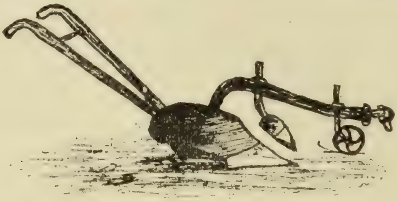
Assuming for the sake of making clear the character of the work to be attempted in Farm Mechanics, that the students have received their lesson in Theoretical Mechanics on the First Law of Motion,—"A body perseveres in a state of rest or of moving uniformly in a straight line except in so far as it is changed by external forces." So that once a body is put in motion it will continue in motion and in a straight line unless something checks or hinders it. The resistance to motion must come from without the body itself, and as it is a very important factor when considering work, since a great deal of energy is taken up in overcoming it. It would be well to recall and consider some simple facts bearing on the causes of resistance which we call "friction,"—and point out the importance of adopting methods for reducing it as much as possible whenever it is a drawback to efficient work, and whenever of value, every effort should be made to increase it,—before passing on to discuss in detail an implement in the construction of which friction plays an important part.

No one, who is accustomed to work, is entirely unacquainted with the fact that resistance can be diminished by smoothing down roughness on surfaces, so that it is not so difficult to push a barrow on a smooth macadamized road, as it is to do it on a rough gravel road. The harder and smoother the surfaces, the less will be the friction. Where hard metal is used the surface should be as smooth as possible. In heavy machinery, next to having all the important bearings of the hardest metal, it is essential to have a constant supply of oil fed to them by vessels attached. In putting wheels on to waggons and other vehicles, the object is to reduce friction; and by smearing the axle with a greasy substance, it is reduced to a minimum. In winter, sledges are used because the hardened surface of the snow becomes smooth, and it is an advantage to the animal drawing the sledge; but get rid of the snow, and the friction between it and the ground is so great that we have to put it on wheels. Here, owing to the circular form of the wheels, the surfaces between them and the road are very small, decreasing the amount of friction to the greatest possible extent.

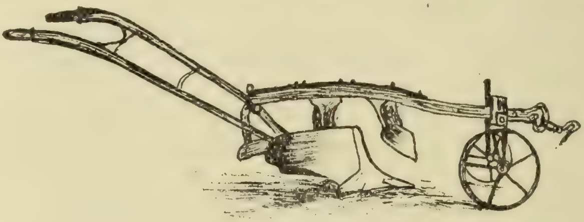
Having made it clear that a large amount of energy is wasted in overcoming friction, and the need for keeping machinery and implements in good condition, we proceed to discuss the implements of the farm used for the tillage of the soil. Of these, the plough unquestionably demands the first consideration. Its function is to penetrate, break up and reverse the firm surface of the field. Although draught is important, economy of time and efficiency of result are the most valuable factors in a plough. The suitability of a plough for any purpose depends upon the nature of the land and the kind of work it has to do. Any plough to be efficient must thoroughly invert the soil, covering all stubble, weeds, or manure and leave a new surface exposed to the air.



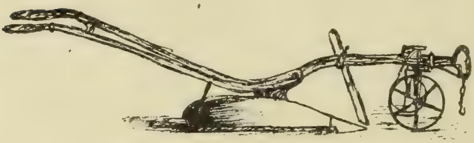
Plan of plough showing curved over end of breast and angle it forms with beam.



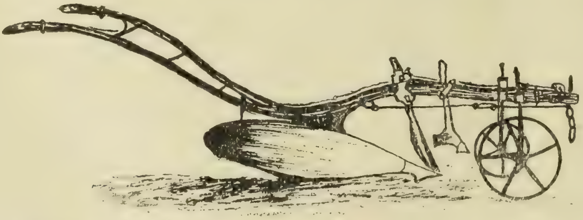
American general purpose plough, which will produce pulverized furrows on either light or heavy land.



British digging or pulverizing plough.



Plough suitable for light land, having a long breast much curved over at end and lying close to bottom of furrow.



Plough suitable for heavy land, having long breast raised at end. Will produce rectangular furrow.

In its action of cutting and turning over the earth, the friction is entirely a sliding one: the character of the material employed in constructing the plough, the finish imparted to it, and also the form given to the parts, are very important features in determining the force required to perform the work. It is in respect of these parts that most of the improvements in this style of implement have been made. It follows, then, from what has been said as to materials used in construction, not only on the score of economy alone, but on account of ease of draught by decreasing friction, that all wearing parts of ploughs, instead of being made of cast iron left in the rough state as it comes from the mould, should be of chilled steel, tempered and highly polished. This improves their scouring qualities and greatly reduces the draft necessary to operate them. The addition of wheels also contributes to decrease the resistance, and consequently the ease in draft, requiring considerably less strength and skill to hold it to its work.

Speaking broadly, ploughs may be classed as those having long-breasted or mould boards, with a gradual turn, and those having short-breasts and a fairly sharp turn. In a general way it may be said that those having long-breasts will cut an unbroken rectangular furrow, while the short-breasted will produce a broken, pulverized slice having no angle. The reason for this difference is very simple. In the long-breasted ploughs, after the slice has been cut off by the coulter and share, it is very gradually raised on one side and gently pushed over into its place by the curved-over end of the mould-board. The curves of the breast traversed by the cut furrow are so long and gradual that the bending does not cause any breaking or cracking of the slice, and it is laid over whole in the same condition as it is cut.

In the short mould-board plough the same amount of curving and bending is compressed into about half the distance, with the result that the cut-off furrow is first of all bent abruptly upwards, and as the surface in contact with the breast has to travel over greater space than the upper surface, there is a tendency to split the furrow into horizontal layers. As this turning upward continues, the bending becomes too rigid for the process, and the slice becomes broken with cracks running across its width. The furrow having now reached its highest point is just as suddenly bent over away from the plough, with the result that it is again broken by cracks running along the length of the furrow. This thoroughly broken up soil falls into its place in a remarkably good tilthy condition. These results can invariably be secured by using suitable ploughs in a soil in good condition for ploughing, but cannot always be obtained under all conditions.

Every short-breasted plough will not necessarily produce the best result. The common digging plough has short enough breast and the rapid upward turn of the front will break up the furrow to a considerable extent, but the hindermost part of the wing does not, as a rule, turn over sufficiently towards the ploughing to effect the final breaking up of the furrow and to lay it in its place upside down. The tendency of the short-breasted plough whose turns up and over are not sharp enough, is for the furrow-slice to be left standing on edge when it is damp, or for the soil to simply fall off behind without being turned over at all when it is dry.

These pulverizing ploughs demand very different setting from the ordinary long-breasted kind. They will "float" as evenly and as easily as it is possible for any plough to do. But the ordinary long-breasted plough will do most efficient work when it turns a furrow about one and a half times as wide as it is deep. With any plough the furrows are laid more evenly and with the greatest regularity when it is slightly wider than the cut of the shear, for the uncut portion acts as a hinge upon which to turn the furrow and prevent the curved breast from throwing it too far over towards the ploughing. Particularly so is this the case with the short-breasted plough, for the sharp upward and outward turn of this plough tends to throw the slice away from the plough before it is properly broken, and unless the furrow slice is held in this way until the final bend breaks the hinge and drops it into its place, untidy work is the consequence. The width of this uncut part should not exceed half the depth of the furrow. When the soil is dry and hard even the long-breasted plough will produce a somewhat broken furrow, and when the land is wet and dough-like, the most suitable short-breasted plough will fail to pulverize the soil properly; but given ordinary conditions such as are suitable for ploughing, results as stated may be looked for.

On a light sandy loam, the condition of the turned-up surface matters very little if the covering in is effectuallv accomplished, for whatever the shape of the furrow it is always porous and easily brought to a fine tilth. Should there be any particular conditions required on this class of soil, it is that the furrows be tightly pressed together so that there shall be no intervening spaces and that the soil shall not lie too loosely. To secure the necessary pressure of the soil, it needs only to have a plough with a long breast, which shall be adjusted at an angle sufficiently wide from the line of the beam so that the tail end of the breast shall be close to the ground with a considerable curve towards the ploughing. The effect of this arrangement is that the newly cut slice is pushed up tightly against the others and as the breast slides over it, presses the furrow firmly down: but consider for a moment the effect of this squeezing and pressing upon a soil inclined to be wet and sticky. It would render the surface in such a condition that no amount of harrowing would ever produce a reasonable tilth. We may conclude, then, that the plough should be a tillage implement; that upon any but the very lightest soils it must do more than invert the earth in regular furrows: it must leave the soil in such a condition as to be prepared for its purpose with the least possible expenditure of time and labour.

Much of the difficulty in managing short-breasted ploughs, and the unsatisfactory work produced by them, is invariably due to want of thought and precaution in setting them or ignorance as to the construction of the implement. These ploughs face the work in such a very different way from the more common shapes that they require totally different setting, and unless the operator understands the construction of his plough, he creates much needless draft, more work for himself and horses, and gives an untidy appearance to the ploughing.

So far we have regarded friction as a disadvantage to work; it may, however, be converted to do a large amount of useful service. The sustaining power of a coil of rope round a post, is a remarkable instance of the value of friction. It is found that with a coil once round a post, a man exerting a pull of 100 pounds can sustain 800 pounds, and with the same pull and two coils he can support eight times 800 lbs., and with a third coil, eight times as much as he can with the two.

These simple facts would naturally lead up to the consideration of pulleys and belting applied to various machinery.

These and kindred subjects have a direct bearing on the successful and intelligent use of machinery and implements on the farm, and I consider that adequate instruction concerning them is of essential importance. Up to the present they have not received the attention their importance warrants. I have searched the prospectuses of most of the Agricultural Colleges but have not found one in which the subjects were taken up in a way commensurate with the benefits to be derived from the use of machinery on the farm. For this and other reasons, the course will be at first largely experimental; but, with the co-operation of the various Professors, we hope to make this course not the least useful of those offered by the College.

COURSES OF INSTRUCTION.

Fall Term, 1905—*Normal Course.*—This term opened with five students in attendance taking various branches of Manual Training.

Chas. T. Yeo, Little Britain, Ont., a full course student, completed his term at Christmas. Soon after his graduation he was appointed to a position on the staff of Manual Training Instructors of the Board of Education, Ottawa.

C. D. Fuller, B.A., Knowlton, Que., was here for three months investigating and studying the whole system of Manual Training. He worked a large number of models of the woodworking and cardboard courses.

M. M. Hunt, Knowlton, Que., entered for a short course in woodworking, Basketry, and Colour.

J. E. Lyon, Guelph, a full course student, took up the Primary work, including Cardboard and Colour.

L. W. Taylor, Guelph, Supplementary in Woodworking.

Agricultural Course.—Sixty Second-Year students attended the Metalworking course.

Nature Study Correlated Course.—Classes in Drawing, Brush, Colour and constructive work were conducted on the lines set forth in the last report.

Optional Courses.—Nineteen pupils of the Domestic Science Department received instruction in Woodworking and Basketry.

Winter Term, 1906. *Normal Course.*—Four students were admitted. J. E. Lyon undertook some advanced work in Colour, Design, Basketry, and Cardboard modelling.

M. Bradshaw, Morden, Man., entered for a course in Primary constructive work, Colour, and Basketry.

M. M. Hall, Dunham, Que., devoted herself to Woodwork, Basketry, and Colour Work.

L. W. Taylor, Guelph, continued his supplementary Woodworking.

Agricultural Course.—Ninety-seven First-Year men received instruction in Woodworking.

Optional Courses.—Twenty-three took Woodcarving; six, Colour work, and six Art Metalwork.

Spring Term, 1906. *Normal Course.*—Three students attended.

J. E. Lyon, Woodworking.

S. Crysler, Berlin, Supplementary Primary Constructive work.

L. W. Taylor, Woodworking.

Nature Study Correlated Course.—Was attended by forty-nine students.

Optional Courses.—Ten took Woodcarving, five Colour work, and five Art Metalwork.

Fall Term, 1906. The number of students for this session are:

Normal Course, four.

Nature Study Correlated Course, ten.

Optional Courses, twenty.

I have the honour to be, Sir,

Your obedient servant,

JNO. EVANS.

PART XIX.

THE PROFESSOR OF NATURE STUDY.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to present this, the third annual report of the Nature Study department.

I think it may safely be asserted that the Nature Study cause has been making progress in the schools of the Province of Ontario. This conclusion is forced on one from seeing the interest taken by teachers in the subject at their conventions and in the visits to the College. One does not find the croaker go unchallenged now; progressive teachers have proven its efficacy in training youth in powers of observation, in habits of finding reasons for things and in ready expression. Of course there is much to be done yet; teachers will for a long time continue to teach the school subjects after the manner in which they themselves were taught, and impose weary grinds on definitions, least common multiple, compound multiplications in a foreign currency, etc.; but there will gradually be a betterment of the old methods.

This change in the attitude of teachers has many causes. In the first place they are putting a reasonable interpretation on the new regulations. When they were first advanced, consternation reigned at the thought of having to know about every animate and inanimate thing under the sun. It is now felt that all that is expected of one is to do his or her best with the material at hand. Then the newer generation of teachers graduating from the Normal Schools are equipped for the work, and are taking their methods into their communities. A better class of literature also prevails; the older books had their nature lessons in the form of long lists of questions, wearisome to teacher and pupil; the newer books on methods have spontaneity for their keynote. Parents, too, are interested in this side of the children's school work; the attention paid the subject by the family newspapers, and the abundant popular nature literature that has been a feature of recent book publications, help towards this.

Spring Term Class.

Our class of this term included teachers from Manitoba and Saskatchewan. We were thus representative of all Canada with the exception of Alberta and British Columbia.

Thirty-six were holders of Macdonald Scholarships. Misses Bradshaw, Williams, and MacMillan were admitted on the same terms as regular Institute students. Mr. Bennett represented the Education Department of Saskatchewan. Mr. McCormac is the Public School Inspector for King's County, P.E.I.

Ontario.

George J. Anderson	Cobourg.
Mable C. Buckle	Amherstburg.
Jessie Burnett	Perth.
Kate A. Evans	Corinth.
Muriel J. Hockey	Welland.
J. A. Keays	Toronto.
A. Maud Legge	Bethany.
Bella McDiarmid	Avonmore.
Nealina McMillan	Guelph.
Will H. Metcalf	Cobourg.
Frank J. Newhouse	St. Catharines.
John Patton	Kemptville.
Kate M. Stewart	Meaford.
Mary E. Stinson	Westport.
Aggie Thorburn	Gore Bay.

Quebec.

Margaret H. Boyd	Granby,
Bessie C. Hall	Cookshire.
Mary H. Hall	Dunham.
Lucy H. Hume	Leeds Village.
C. L. Theresa Metcalf	Avon.
E. Winnifred Miller	Clarenceville.
Helen Paton	Lachute.
Elizabeth P. F. Patterson	Lachute.
Helen A. Rothney	Leeds Village.
Ella B. Sweet	Sutton Junction.
Sarah M. Thompson	Kinnears Mills.
Ruby J. Godue	Knowlton.

New Brunswick.

Georgina Dickson	Tide Head.
Martin G. Fox	Gagetown.
Margaret Kerr	Bocabec.
Lena Miller	Dalhousie.
Mary A. Reid	Point La Nim.
Annie M. Smith	Coverdale.

Nova Scotia.

Hattie E. Chisholm	Bear River.
Ethel Cochrane	Windsor.
Robert Dorman	Barrington Passage.
Jessie E. Freeman	Greenfield.
Jeanette McLeod	Old Bridgeport Mines.
Annie J. MacMaster	Port Hood.
Mary Spencer	Great Village.
Louis Rens Skinner	Berwick.

Prince Edward Island.

Virginia Byrne	Clear Spring.
Ella J. Dorsey	Charlottetown.
Grace E. Dutcher	Charlottetown.
Margaret James	Charlottetown.
Annie Lockhart	St. Eleanor's.
G. J. McCormac	Charlottetown.

Manitoba.

B. Maud Bradshaw	Morden.

Saskatchewan.

Lindsay H. Bennet	Regina.
Lenore Williams	Yorkton.

SUMMER TERM.

The Summer Course was of four weeks duration (July 3rd-28th). There were seventeen teachers in the class. The necessity of boarding in the city deters the entrance, to some extent, of a larger number. We made arrangements again as last year, however, for a noon lunch, using materials of our gardens and buying milk, butter, eggs, and bread from the College. We had the help of Mr. T. J. Moore, Principal of St. George's P. S., Guelph, during the course; he rendered excellent service in the study of birds and plants.

SUMMER TERM CLASS.

Armstrong, Lottie	Amulree.
Doan, Emma H	Cleveland, Ohio.
Gayman, H. M.	Jordan Harbor.
Lyon, Mrs.	Guelph.
Moore, Florence E.	Eden Mills,
Marshall, Esther	Brampton
Mackenzie, Marion F.	Marden.
Mackenzie, Eva F.	St. Thomas.
McNab, J. C.	Guelph.
Reid, Mary M.	Brisbane.
Robinson, Hattie	St. Thomas.
Sunter, Bertha	Meaford.
Snider, W. W.	Ottawa.
Schell, Arthur W.	Almonte.
Ward, Edward	Collingwood.
Ward, W. G.	Guelph.
Yeo, C. T.	Little Britain.

FALL TERM CLASS.

For different causes, this has been our smallest Nature Study Class. The Departments of Education of Nova Scotia and New Brunswick did not see their way clear to incurring the expense of sending delegations, particularly as they have now representative teachers disseminating information acquired at Guelph to their teachers through papers and lessons at conventions. In Quebec, owing to a great dearth of teachers, only five applications were received for twelve scholarships offered, and of these, only three were able to join the class.

In Ontario, the experience of Quebec was duplicated; fourteen scholarships were advertised, five applications were received and three teachers entered for the work. Our first representatives from across seas was in this class.

Armstrong, Jennie, Miss	Bristol, Que.
Abercrombie, Ivy, Miss	Manchester, Eng.
Bartley, Annie, Miss	Lindsay, Ont.
Cummiskey, Katie, Miss	Webster's Corner, P.E.I.
Hawken, Lizzie C., Miss	Alma, Ont.
Keilly, C. W., Mr.	Stanley Bridge, P.E.I.
MacIntyre, Maud, Miss	Avonmore, Ont.
MacKinnon, Mary E., Miss	St. Peters, P.E.I.
Scott, Ida B., Miss	North River, P.E.I.
Sornberger, Mary I., Miss	Stanbridge East, Que.
Stevens, C. Louise, Miss	Bedford, Que.

New Equipment.

We have installed in a room adjacent to our laboratory, a work bench and kit of tools. It is not to replace the facilities offered by the Manual Training department, but to supplement them. In the pursuit of our regular work in garden, field, and laboratory, the need of making a simple piece of apparatus or repairing broken articles frequently arises and the demand for tools is felt. It is such an outfit as any well equipped farm workshop might have and such as we hope every well-equipped rural school will have as a substitution for the formal manual training equipment of the town or city school.

Besides putting the tools to practical use, they were made use of for nature study observational lessons, instruction in the mechanical principles involved in their operation, demonstrations of their construction, uses and care. This work was in charge of one of the students, Mr. L. H. Bennett of Regina.

In the Province of New Brunswick this one-bench plan is in operation in the rural schools. The trustees are aided in the purchase of the equipment by a grant from the provincial treasury, and for successful teaching of the subject teachers have their salaries substantially supplemented. The teachers must have a certificate for a short-course training to be qualified for this work.

We submit a list with the prices of each article. It is not intended that such a complete outfit is essential to a commencement in this phase of manual training. A selection of six dollars worth of tools would be ample for a beginning in many cases. The tools are classified after a scheme evolved from a general lesson on tools.

Single Bench Tool Kit, $42.00.

Cutting Tools ($15.05).

Saws.—Rip saw, $1.40; keyhole, compass or turning saw, 40c.; back or tenon saw, $1.25; panel, $1.00; metal saw, 35c.

Chisels.—1-4 in. socket mortice chisel, 25c.; 3-8 in. socket mortice chisel, 30c.; 5-8 in. socket mortice chisel, 35c.; 3-4 in. socket mortice chisel, 40c.; 1 1-4 in. socket mortice chisel, 55c.; 3-4 in. bevelled-edge firmer, 28c.; cold chisel, 5c.

Planes.—Jack plane, $1.25; block or hand plane, 65c.; spokeshave, 30c.

Files.—Saw, triangular or three-cornered file, 10c.; 10 in. half-round, 30c.; 8 in. flat or mill-saw file, 15c.; 1-4 in. round or rat-tail, 15c.

Boring Tools.—1-4 in. augur bit, 15c.; 3-8 in. augur bit, 18c.; gimlet bit, 8c.; rimer bit or countersink, 13c.; gimlet, 10c.; 1-4 in., 3-8 in. 1-2 in. 9-16 in., 5-8 in., $\frac{3}{4}$ in., 7-7 in., 1 in. augur bits, $2.25; drill, 18c.

Shears.—Tinman's shears, $1.00; cutting pliers, 75c.; scissors, 75c.

Marking Tools ($6.85).

Tape measure, $2.25; land chain, $3.30; marking gauge, 15c.; mortice gauge, 60c.; scratch or marking awl, 15c.; compasses, 40c.

***Testing tools* ($2.70).**

Try square, 35c.; framing square, $1.25; bevel, 35c.; level, 75c.

Holding Tools ($3.75).

Iron bench vise, 45c.; ratchet brace, $1.50; monkey-wrench, 45c.; small screw-driver, 20c.; screw-driver or turnscrew (large), 30c.; screw-driver bit, 10c.; pliers, 75c.

Driving Tools ($2.00).

Hammer (claw), 50c.; rivetting hammer, 50c.; mallet, 35c.; nail set or punch, 15c.; saw set, 50c.

Miscellaneous ($1.65).

Oil-stone, 40c.; oil can, 5c.; putty knife, 15c.; belt punch, 10c.; glass-cutter, 35c.; sloyd knife, 35c.; can-opener, 10c.; wad punch, 15c.

Bench and Vise ($10.00).

Summary.

Cutting tools, $15.05; marking tools, $6.85; testing tools, $2.70; holding tools, $3.75; driving tools, $2.00; miscellaneous, $1.65; bench and vise. $10.00; total cost, $42.00.

SCHOOL GARDENS.

It would appear that the school garden movement in Ontario has failed to meet expectations. Although the Department of Education offers liberal terms for the acquisition of an acre of ground for garden purposes, very few schools have taken advantage of the offer.

A good work is being done in many places through horticultural societies in inducing children to grow flowers at home; and in a few places children are doing garden work in home gardens, but the formal school garden on the school grounds is practically unknown. Perhaps it will not be general until the profession steadies down into well paid and permanent conditions.

The movement is more apparent in Nova Scotia; many schools there have adopted them. The following from a letter received from one of our old students explains itself:

> "My school was very large, averaging over forty scholars for some time, and some of these were doing High School work. I had three High School grades and eight Common School grades; yet I found time to do some Nature Study work and especially to drop a few helps and suggestions, leaving the pupils to follow up the same.
>
> "From a piece of waste ground belonging to the school ground, we made a school garden, 30 x 100 ft., and fenced it. To obtain funds for fertilizer and fence, etc., we gave a concert followed by a Pie Social, which netted us about $25.00.
>
> "The school garden proved a complete success, and my teaching did as well; for although it was a rural school, they raised my pay from $250 to $350, exclusive of grant."

AGRICULTURAL HIGH SCHOOLS.

We have no Agricultural High Schools in Canada as yet. As a contribution to the discussion in connection with this subject, we reprint an account of the experience of the State of Wisconsin in the matter. It is taken from one of the bulletins published by the Dunn County School.

HISTORICAL STATEMENT.

The State of Wisconsin was the first in the Union to encourage the establishment of schools for the teaching of agriculture, manual training and domestic science to the rural classes. County schools of agriculture and domestic economy were created by Act of the State Legislature of Wisconsin in 1901. The legislature two years prior to that had paved the way by the appointment of a commissioner to investigate and report upon the methods of procedure in similar work in other places. In the report the commissioner, Hon. L. D. Harvey, then State Superintendent of Public Instruction, recommended that legal authority be given to counties in the State to establish schools of this character. The law allowed two counties to build and equip such schools. Dunn county was the first to organize a county school board under the law and Marathon county soon followed. These two counties borrowed money, and built similar buildings, which were opened for use in October of that year. These courses of study were planned by the principals of the two county agricultural schools and the State Superintendent. Each school has found it necessary to modify the courses to suit the local conditions. These schools have been equipped at the expense of the counties where they are located. This is true as to buildings, furniture, apparatus, machinery and stock. But the State aids each school to the extent of $4,000 a year to apply on the running expenses.

POSITION OF SCHOOL IN STATE SYSTEM.

The chief purpose of the county agricultural schools as now established in Wisconsin is to popularize agricultural education more than can be done by a well-filled state college. The schools are subordinate to the state college in that they are not so advanced, especially in their academic subjects. Students are admitted directly from the rural schools. Most of them would never go to an agricultural school if this new class of schools were not brought close to them. Some students board at home and help with home chores, others visit home at the end of each week and are dominated by the home spirit throughout their school life. Certainly these county schools in Wisconsin reach a class of pupils that would not feel that they could spare the money necessary to attend the State Agricultural College. And yet there are students, who, after getting the work of the county school, will feel like continuing their education and will attend the State College of Agriculture. Several graduates are already planning such a course. More county schools of agriculture will help fill the State College of Agriculture to overflowing.

GENERAL EQUIPMENT.

The Dunn County School of Agriculture has three buildings located on a half block in the center of Menomonie, the county seat. Here there is still room for poultry runs and a small garden for girls' practice. Philanthropic citizens and the city gave these grounds to the School. The school farm consists of six acres located on the county fair grounds nearly one mile from the school. Here the boys of the school have practice in farm, orchard, and nursery work. The area may be increased from time to time.

BUILDINGS FOR THE AGRICULTURAL SCHOOL.

The School has the use of four buildings:—

The main building, built by Dunn County, is 42 x 96 feet, three stories high, built of brick. The first and second floors are devoted to the uses of the School of Agriculture, and the third floor to the County Teachers' Training School. A glass wing, 30 x 30 feet, given by Mrs. Bertha Tainter, is used for greenhouse purposes.

The mechanical building, given by Senator J. H. Stout, is 24 x 50 feet, two stories high over a high bank basement.

The horticultural building, given by citizens and city, is 28 x 50 feet, two stories high over a bank basement. The basement story is what gives the building its name, as it is used for potting of plants, grafting and budding lessons, winter storage of scions, roots, bulbs and tender plants.

The farm tool house, built by students, is 14 x 16 feet, one story high. It is located on the county fair grounds near the school farm.

The probable number of students that could attend the county agricultural school at any one time is about 125.

The carpentry and blacksmith shops are supplied with the best of tools, substantial and handy benches (made by students), forges, anvils, vises, lathes, circle saw, steam engine, gasoline engine, etc. The sewing department has its cutting tables, work tables, sewing machines, tracing boards and wardrobes. The kitchen equipment, of utensils, dishes, tables, cabinets, ranges, food sets, cupboards, sink and refrigerator, is complete in every detail. The laboratory is provided with apparatus necessary for chemistry, physics, plant life and soil experiments. Facilities for stereopticon illustration are provided. Machinery and tools for use on the farm and garden are of the most modern types.

The equipment in the dairy includes cream separators, Babcock testers, combined churn and worker, ripening vat, milk heater, scales and complete set of utensils. The sloping cement floor and brick walls make the creamery quite sanitary and modern.

Poultry quarters are constructed on model plans of economy and cleanliness. The department is supplied with two incubators and two brooders. Brooders were built by carpentry students. A Dandy bone grinder helps materially in the winter production of eggs. The best types of farm poultry are kept.

In regard to building and equipment it should be remembered that for the amount which the county has expended it has two young institutions established, viz., the Agricultural School and the Teachers' Training School. Much has been saved by building for two schools at the same time. The main building cost $16,500; the horticulture building given by citizens and city of Menomonie and repaired by insurance money after the fire of 1903, is valued at $2,600; the mechanical building given by Senator J. H. Stout was moved by the county onto a basement built by the county, valued at $3,000. The farm tool house, built by students, is valued at $100. The complete school equipment besides buildings is value at about $9,000. This includes all apparatus, furniture and tools purchased, donated to the school or made by students.

The entire property of the two county schools (Agricultural and Teachers') has cost the county $23,035. But the total valuation of the property, including the small farm, is $39,103.85. The difference is made up largely by gifts from manufacturers and citizens, and by articles made by students in the School of Agriculture.

Cost of Running the School.

The State law authorizes any county (not to exceed four) to build and equip a school of agriculture and pay the running expense for one year. After that the State will pay two-thirds of the annual cost of maintaining the school—not to exceed $4,000 for each school. Experience of two years shows that the annual running expense is about $6,000, two-thirds of which is paid by the State and only one-third by the county.

The assessed value of taxable property in Dunn county is about 10½ million dollars. Any person with an assessment of $100 will pay less than two cents to support the school. Property assessed at $1,000 requires a payment of less than twenty cents a year, to run this school. Thus it is seen that the annual cost is almost nothing to the individual tax-payer in the county.

When such are the facts, all who may have had some fears regarding the matter of annual cost may feel at ease; for surely a county in an agricultural region can easily support its own "Farmers' School."

The farmers of the county can each receive many times more benefit from the school than it costs them.

Correlative Lines of Work for Farmers and Teachers.

Much agricultural information is disseminated from the agricultural school to the farmers of the county. Directions for planting, suggestions as to varieties, combatting noxious weeds, helping establish co-operative creameries, planning barns, silos, school houses, dwellings, devising ventilators, selecting stock, and many other subjects are taken up by the instructors with individual farmers. The School has done a great deal of milk and cream testing for farmers for the purpose of helping to improve dairy herds. On the school farm we try such new crops as should be used by those living in the section. Many hundreds of bulletins on special farm topics have been placed in the hands of farmers desiring information on these subjects.

A novel feature of the school's work in Dunn county is the introduction, through the rural teachers, of elementary agriculture and manual training into district schools of the county. By an interchange of classes with the County Teachers' School the Agricultural School teaches the rural teachers to handle these subjects in their school in a very creditable manner.

STATE OF WISCONSIN LAW REGARDING COUNTY AGRICULTURAL SCHOOLS.

Schools of Agriculture and Domestic Economy.

(Chap. 288, Laws of 1901). Section 1. The county board of any county is hereby authorized to appropriate money for the organization, equipment and maintenance of a county school of agriculture and domestic economy. The county boards of two or more counties may unite in establishing such a school, and may appropriate money for its organization, equipment, and maintenance.

SECTION 2. A board to be known as the county school board is hereby created, which shall have charge and control of all matters pertaining to the organization, equipment and maintenance of such school, except as otherwise provided by law. Said board shall consist of three members, one of whom shall be the county superintendent of schools of the county or district in which the school is located. The other members of the board shall be elected by the county board for the term of three years from the date of their election, but no member of the county board shall be eligible. Vacancies existing in the board from whatever cause, except in the case of the county superintendent, shall be filled by appointment made by the chairman of the county board, if the county board is not in session when such vacancy occurs. If the county board is in session, vacancies shall be filled by election by said board for the unexpired term. Appointments made by the chairman of the county board, as hereinbefore specified, shall be for the term to elapse until the next regular meeting of the county board. Each person appointed or created a member of the county school board, shall within ten days after the notice of such appointment, take and subscribe an oath, to support the constitution of the United States and the constitution of Wisconsin, and honestly, faithfully, and impartially to discharge his duties as a member of said board, to the best of his ability, which oath shall be filed in the office of the county clerk. He shall also, within the same time, file a bond in such sum as may be fixed by the county board, which bond shall be filed in the office of the county clerk. Within fifteen days after the appointment of said board, the members thereof shall meet and organize by electing one of their number as president. The county superintendent of schools shall be *ex-officio* secretary of the said board. The said board shall prescribe the duties of the several officers, except as fixed by law.

SECTION 3. Whenever two or more counties unite in establishing such a school, the provisions of section 2 of this Act shall apply to the organization of the county school board, and to filling vacancies therein, provided that the county superintendent of the county in which the school is located shall be a member of the board and *ex-officio* its secretary, and two members shall also be elected from each county by the county board thereof. But no member of the county board shall be eligible.

SECTION 4. Whenever two or more counties unite in establishing and maintaining such school, the county school board provided for in such cases shall determine the amount of money necessary for the equipment and maintenance of the school for the sceond year, and annually each year thereafter; they shall apportion the amount to be raised by taxation among the counties in proportion to the assessed valuation of each county, as last fixed by the state board of assessment, and shall report to the county clerk of each county the apportionment so made on or before the first Monday of November in each year. The amount so apportioned to each county shall be levied in the county tax for the ensuing year for the support of the school.

SECTION 5. The county treasurer shall be *ex-officio* treasurer of said board; all moneys appropriated and expended under the provisions of this Act, shall be expended by the county school board, and shall be paid by the county treasurer or treasurers on orders issued by said board, and all moneys received by said board shall be paid to the county treasurer for the fund of the county school board.

SECTION 6. In all county schools of agriculture and domestic economy organized under the provisions of this Act, instruction shall be given in the elements of agriculture, including instruction concerning the soil, the plant life, and the animal life of the farm; a system of farm accounts shall also be taught; instruction shall also be given in manual training and domestic economy, and such other subjects as may be prescribed.

SECTION 7. Each such school shall have connected with it a tract of land suitable for purposes of experiment and demonstration, and not less than three acres in area.

SECTION 8. The schools organized under the provisions of this Act shall be free to inhabitants of the county or counties contributing to their support, who shall be qualified to pursue the course of study, provided they shall have at least the qualifications required for completion of the course of study for common schools. Whenever students of advanced age desire admission to the school during the winter months in sufficient number to warrant the organization of special classes for their instruction, such classes shall be organized and continued for such time as their attendance may make necessary.

SECTION 9. The State Superintendent shall give such information and assistance and establish such requirements as may seem necessary for the proper organization and maintenance of such schools. With the advice of the dean of the college of agriculture of the state university, he shall prescribe the courses of study to be pursued, and determine the qualifications required of teachers employed in such schools. He shall have the general supervision of all schools established under this Act; shall from time to time inspect the same, make such recommendations relating to their management as he may deem necessary, and make such report thereon as shall give full information concerning their number, character and efficiency.

MAINTENANCE OF COUNTY SCHOOLS OF AGRICULTURE AND DOMESTIC ECONOMY.

(Chapter 143, Laws of 1903, amending Section 10, Chapter 288, Laws of 1901). SECTION 10. Any school established under the provisions of this Act, whose courses of study and qualifications of whose teachers have been approved by the State Superintendent and the dean of the college of agriculture may, upon application, be placed upon an approved list of county schools of agriculture and domestic economy. A school once entered upon such list may remain listed and be entitled to state aid so long as the scope and character of its work are maintained in such manner as to meet the approval of the State Superintendent; provided, that he shall not place upon said list more than four schools. On the first day of July in each year, the secretary of each county school board maintaining a school on the approved list, shall report to the State Superintendent, setting forth the facts relating to the cost of maintaining the school, the character of the work done, the number and names of teachers employed, and such other matters as may be required by the county board or the State Superintendent. Upon receipt of such report, if it shall appear that the school has been maintained in a satisfactory manner for a period of not less than eight months, during the year closing on the thirtieth day of the preceding June, the said superintendent shall make a certificate to that effect and file it with the Secretary of State. Upon receiving such certificate, the Secretary of State shall draw his warrant, payable to the treasurer of the county maintaining such school, for a sum equal to two-thirds the amount actually expended for maintaining such school during the year; provided, that the total amount so apportioned shall not exceed four thousand dollars to any one school in any one year; when more than one county has contributed to the support of the school, the Secretary of State shall draw his warrant payable to the treasurer of each county for such portion of the state aid as the amount contributed by his county is part of the total amount contributed by all the counties for the support of the school for the preceding year. The Secretary of State shall annually include and apportion in the state tax such sum as shall have been so paid.

This chapter provides for two additional county schools of agriculture and domestic economy, and increases the amount which the state may be called upon to pay for each of such schools from one-half to two-thirds the amount expended therefor, but in no case is such amount to exceed $4,000.00.

The regulations adopted by the State of Victoria (Australia) are suggestive of this trend amongst our brethren on the other side of the world. They are taken from the official state educational Gazette of July, 1906.

REGULATION XXVI.—AGRICULTURAL HIGH SCHOOLS.

1. The Minister of Public Instruction may establish Continuation Schools, to be called Agricultural High Schools, under the following conditions:—

(*a*) At least one-half of the cost of the necessary buildings and equipment shall be contributed by local subscription.

(*b*) An area of ground of not less than twenty acres, situated in a position convenient to the High School, shall be provided, and vested in the Minister.

(*c*) At least fifty students paying prescribed fees shall be guaranteed before a proposal to establish a High School is entertained.

2.—(*a*) Agricultural High Schools shall be under the control of the Minister, who will be assisted in the questions affecting course of study and general policy by a committee, consisting of the Minister of Agriculture, the Director of Education, and the Director of Agriculture.

(*b*) A local council, consisting of five members, to be appointed by the Governor in Council, shall be established for each district High School. Their duties will be to exercise a general oversight in matters affecting their school, to expend the maintenance allowance allotted to each school, to exercise such supervision as the Minister may authorize over the farm operations, and to advise the Minister in all matters specially pertaining to the school.

3. The qualifications for enrolment of students shall be as follow:—

(*a*) Pupils must have obtained the Certificate of Merit, or must have passed the primary or some higher examination of the Melbourne University; or must have satisfied an inspector of schools that they are qualified to profit by the course of study in such school.

(*b*) They must furnish satisfactory evidence that they are of good moral character, and of good general health.

(*c*) They must be at least fourteen years of age at the date of enrolment.

4. The Minister may grant in each year scholarships entitling holders thereof to free tuition for two or more years in any approved courses of study prescribed in Agricultural High Schools.

5. The Council of any Agricultural High School may nominate for free instruction in any prescribed course of study in that school students who possess the qualifications stated in section 3, provided that the number of students so nominated shall not in any year exceed ten per cent. of the total number of students paying full fees enrolled in that school.

6. The course of study shall include such subjects as may be determined upon by the Minister, with the advice of the committee named in section 2 (*a*).

7. At least one-third of the time devoted to instruction shall be spent in the study (both practical and theoretical) of the sciences bearing upon agriculture, and one-third of the time shall be devoted to manual and practical work on the school farm or in the school workshop.

8. During their course in an Agricultural High School, students will be required to attend lessons regularly and punctually in the subjects prescribed for their course, and may further be required to devote such time to practical outdoor work as the principal may direct.

9. The fees to be paid by pupils shall be £8 8s. per annum, payable quarterly in advance.

10. No pupil shall be enrolled after the expiration of the first quarter unless with the special sanction of the Director of Education.

11. Any students may be excluded from attendance at the school on the ground of idleness or misconduct.

12. Holders of scholarships under Regulation XXI 1 (*b*) may be admitted as students at any Agricultural High School, and attendance at such school shall be held to comply with the conditions laid down in such Regulation for attendance at a Continuation School or Secondary School.

13. Candidates for admission to the teaching service of the Education Department may be admitted to an Agricultural High School under the conditions of Regulation X, for admission to a Continuation School, and all the provisions of such Regulation, so far as they may be applicable, shall be held to apply to Agricultural High Schools as regards such students.

VISITS FROM TEACHERS.

In the Spring Term we had the following conventions visit the College and Institute:

May 17th and 18th	West Bruce.	June 15th and 16th	West Huron.
May 31st, June 1st	East Bruce.	June 15th and 16th	Haldimand.
May 31st, June 1st	Oxford.	June 22nd	St. Thomas.

As previously, we furnished them with a program for an evening session in Massey Hall.

The British teachers, too, sent out under the auspices of Mr. Mosely, visited us in small parties during the Fall Term.

In November, we made an exhibit at the Fruit and Flower Show in Toronto, and helped in instructing the visiting school children. Previous to the show there was a demonstration and lecture to the teachers on practical nature collecting.

We extend our thanks again to the College Faculty at large for the valuable help they have given us in our work. We have tried to arrange for short series of lectures or demonstrations in every department, so that our students may have a comprehensive view of the work of the college.

Respectfully submitted,

S. B. McCREADY.

PART XX.

THE LIBRARIAN.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to submit herewith a brief report of the Library for 1906.

During the year we have added 1,300 books to our shelves, which are classified as follows:

Agriculture	194	English	111
Horticulture	42	General Literature	128
Forestry	40	Fiction	59
Veterinary Science	15	Economics	44
Poultry	6	Education	13
Apiculture	5	Public Speaking	19
Entomology	25	Biography	50
Chemistry	67	History	35
Bacteriology	39	Psychology	10
Botany	70	Domestic Science	15
Biology	55	Hygiene	9
General Science	85	Nature Study	15
Dairying	28	Architecture	7
Geology	32	Statistics	6
Astronomy	14	Dictionaries and Encyclopaedias	10

We have had 170 volumes bound, and have purchased back numbers of the following periodicals in order to complete sets: Coates's Herd Book, volumes 32-51; American Clydesdale Stud Book, volumes 1-11; Entomological News, volumes 1-12; The Outlook, volumes 48-71; American Geologist, volumes 1-26.

Through the kindness of the late Walter Riddell, Esq., of Cobourg, we have received the following sets of agricultural journals, valuable in historical research work: The Canada Farmer, 7 volumes; The Cultivator, 20 volumes; The Canadian Agriculturist, 9 volumes.

We desire to take this opportunity of expressing our appreciation of all our exchanges, especially of the United States Department of Agriculture and the Experiment Stations of America, Australia, Cape Colony, India, Japan, South America and Europe. We wish also to acknowledge gratefully the following gifts: From His Excellency Earl Grey: Men of Might, The Empire and the Century, The Hill, Songs of the Glens of Antrim, The Little Flowers of St. Francis of Assisi; and from the United States Commissioner of Fish and Fisheries, nine volumes of U. S. Fish Commission Reports.

I have the honor to be, sir,

Your obedient servant,

ALICE G. ROWSOME,

Acting Librarian.

PART XXI.

THE COLLEGE PHYSICIAN.

To the President of the Ontario Agricultural College:

Sir,—I beg to present to you my report for the year now closing.

The health of Macdonald Hall has been fairly good during the year. On three occasions we were obliged, during last winter, to remove patients to the General Hospital of this city for treatment. Many of the residents suffered from Tonsilitis and Influenza, but no grave conditions developed among them. Early in January a case of Varicella occurred on one of the students but, fortunately, no others contracted the disease. Amongst the staff employed in the kitchen a number of minor accidents occurred—slight burns and scalds and injuries from the bread-cutter. In one instance this machine took a large slice off the ball of the thumb of the young lady's left hand, and she was laid off work for some time. Thus far this fall the students of Macdonald Hall have enjoyed health.

Among the young men attending the College Tonsilitis and Influenza were of frequent occurrence during the winter and also during the late autumn months. A number of minor accidents have come under my care, and one case of Appendicitis. I have also to report a fracture of the femur in the oldest employee amongst the female help in the College. In coming down a short stair she fell and sustained what practitioners consider a bad form of the injury. She was removed to St. Joseph's Hospital for treatment, where she is making a very satisfactory recovery. In the month of December a case of Varicella occurred in the College but spread to no others.

The occurrence of these two cases of contagious disease emphasizes very strongly the need for suitable hospital accommodation in this large and growing institution. At the present time there is no place in which to isolate a case of contagious disease during any period of doubt as to its nature.

The general sanitary condition of the College is excellent.

Respectfully submitted,

W. O. STEWART.

Guelph, Ont., Dec. 24, 1906.

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Twenty-eighth Annual Report

of the

Ontario Agricultural and Experimental Union

1906

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To the Honorable William Mortimer Clark, K.C.,
Lieutenant-Governor of the Province of Ontario.

May it please your Honour :

I have the pleasure to present herewith for the consideration of your Honour the Report of the Agricultural and Experimental Union for 1906.

Respectfully submitted,

NELSON MONTEITH,

Minister of Agriculture.

Toronto, 1907.

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MEMBERS FOR 1906-1907.

The following list of members includes all of those who are or have been connected with the Agricultural College, and have paid the annual membership fee for the present year. It is quite distinct from the list of co-operative experimenters, of whom there are now about 4,800.

Adams, C., Summerland, B.C.
Aldwinckle, E., O.A.C., Guelph.
Allan, F. W., Churchill.
Allen, R. J., O.A.C., Guelph.
Allison, J. B., Leavings, Alta.
Angle, P. E., Fork's Road.
Archibald, E., Ailsa Craig.
Arkell, H. S., St. Anne de Bellevue, Que.
Armstrong, C., Havana, Cuba.
Armstrong, P., Jermyn.
Arnold, J H.., Easton's Cors.
Augustine, H., Burnaby.
Austin, H. S., Lynn Valley.

Bailey, C. F. Peterboro.
Baillie, W., Guelph.
Baker, J., Solina.
Ballantyne, P. M., Lacombe, Alta.
Ballantyne, N. M., Stratford.
Ballantyne, R., Sebringville.
Barlow, B., O.A.C., Guelph.
Barnet, W. A., Living Springs.
Beaupre, F. C., Simcoe.
Bell, H. G., Ames, Iowa.
Bell, G. R., Glanford Sta.
Bethune, Dr., O.A.C., Guelph.
Bingeman, G. W., Bloomingdale.
Binnie, T. H., Bunessan.
Boddy, R. A., Toronto.
Bose, H. N., O.A.C., Guelph.
Bowes, L. A., Strathnairn.
Bowman, Wm., Georgetown.
Bowman, E., Kault, B.C.
Bray, R. N., Nashville.
Breckon, W. D., Bronte.
Brethour, J. E., Burford.
Brodie, G. A., Bethesda.
Brokovski, A. J., Battleford, Sask.
Broome, A. H. S., Hersham, Eng.
Brown, N. E., Pineville, Pa.
Brown, W. A., Meaford.
Brown, W. J., Toronto.
Brownridge, J. W., Hornby.
Buchanan, J., O.A.C., Guelph.
Buchanan, D., Florence.
Bunting, T. G., St. Catharines.
Burns, J. H., St. Marys.
Butler, G. C., Hatfield Pevrel, Eng.

Caesar, L., Mono Rd.
Campbell, D. E., North Bruce.
Campbell, M. A., Zimmerman.
Campbell, A. D., Strathroy.
Campbell, J. A., Lawrence Sta.
Campbell, W. W., Hartford, Conn.
Campbell, J. A., Simcoe.
Canby, F., Burnaby.
Carleton, J. A., Avening.
Carlaw, Geo., Warkworth.
Carpenter, J. F., Fruitland.
Channon, G. C., Oakwood.
Christie, H. R., Amherst, N.S.
Clark, A., O.A.C., Guelph.
Clark, G. H., Ottawa.
Clarke, E. E., Meaford.
Clifford, L. G., Orrville.
Coben, H., Kinmount.
Coglon, M., Bath.
Coke, E. F., O.A.C., Guelph.
Collins, G. W., O.A.C., Guelph.
Cooley, R. B., Cannifton.
Cooper, H. S., Toronto.
Crawford, E. A., O.A.C., Guelph.
Crealy, J. E., Westmount, Que.
Creelman, G. C., O.A.C., Guelph.
Crow, J. W., O.A.C., Guelph.
Cunningham, G. C., Oil Springs.
Curran, G. B., Orillia.
Cutler, G. H., Birnam.

Day, W. H., O.A.C., Guelph.
Day, G. E., O.A.C., Guelph.
Deachman, R. J., Calgary, Alta.
Dean, H. H., O.A.C., Guelph.
Dennis, F. H., Ealing, London.
Dennis, Jas. R., Weston, Ont.
Dewar, W. R. Grahamstown, Cape Colony.
Diaz, G., O.A.C., Guelph.
Diaz, P., Ferrol, Spain.
Douglas, D., O.A.C., Guelph.
Dowling, J. E., Buenos Ayres, S. A.
Drury, E. C., Crown Hill.
Duff, H. C., Dobbinton.
Duffy, C., Nauwigewauk, N.B.
Dunlop, J. S., St. Catharines.
Duthie, Jas., Hartney, Man.

Eastham, J. W., O.A.C., Guelph.
Edwards, S. F., O.A.C., Guelph.
Edwards, W. E. J., Balsam.
Elton, Cecil, Cowley, Alta.
Emigh, C., Holbrook.
Esmond, C. W., Winnipeg, Man.
Evans, J., O.A.C., Guelph.
Evans, L., Lawrence Sta.
Everest, C. F., O.A.C., Guelph.

Fairbairn, J. B., O.A.C., Guelph.
Fairweather, F. H., Alma.
Farley, W. J., Trenton.
Farlinger, W. K., Morrisburg.
Fawcett, C. F., Upper Sackville, N.B.
Ferguson, Jas., Dalmeny.
Fife, Robt., Laurel.
Foster, K. A., Abernethy, Sask.
Foster, N., Toronto.
French, P. E., Vernon, B.C.
Friar, G. M., Shediac, N.B.
Fulmer, H. L., O.A.C., Guelph.

Gamble, W. P., O.A.C., Guelph.

Gilmour, J. D., Doe Lake.
Goble, F., Woodstock.
Gorell, G. H., Gore Bay.
Graesser, F., Guelph.
Graham, W. R., O.A.C., Guelph.
Green, R. J., Toronto.
Grisdale, J. H., C.E.F., Ottawa.
Groh, H., Preston.
Gunn, Wm. H., Toronto.
Gunn, R. E., Beaverton.

Hall, J. S., Weissenburg.
Hamer, R. S., Toronto.
Hankinson, L. D., Grovesend.
Harcourt, R., O.A.C., Guelph.
Hare, J. H., Cobourg.
Harkness, A. D., Irena.
Harries, J. T., O.A.C., Guelph.
Harris, W., Effingham.
Hartman, W. J., Woodbridge.
Hawke, A. H., Drinkwater, Sask.
Hayles, N. A. D., Tapleytown.
Hebert, G., St. Albert, Alta.
Henderson, T. B., Edmonton, Alta.
Heurtley, E. W., O.A.C., Guelph.
Hibberd, G., New Windsor, Md.
Hodgins, E. L., Portage du Fort, Que.
Hodson, R. W., Toronto.
Holtermann, R. F., Brantford.
Horton, D. H., North Pelham.
Howes, A. W., Harriston.
Howitt, J. E., O.A.C., Guelph.
Houser, H. W., Campden.
Hoy, B., South Swansee, Mass.
Hudson, H. F., O.A.C., Guelph.
Hunt, Wm., O.A.C., Guelph.
Hutt, H. L., O.A.C., Guelph.
Hutton, G. H., Lacombe, Alta.

Irvine, W. C., Habermehl.
Iwanami, J., O.A.C., Guelph.

Jackson, W. D., Fulton.
Jacobs, W. S., Toronto.
James, J. L., O.A.C., Guelph.
Jarvis, C. D., Storrs, Conn.
Jarvis, T. D., O.A.C., Guelph.
Jewson, J. E., Stone Quarry.
Johnson, D. M., Toronto, Ont.
Jones, D. H., O.A.C., Guelph.
Jordan, H. A., Windsor.
Jull, M. A., Burford.

Kennedy, W. A., Apple Hill.
Ker, J. H., St. George.
Kerr, Wm., Bronson.
Kewley, H. D., Sarnia.
King, J. H., Smith's Creek, N.B.
Kitchen, E., St. George.
Kitchen, A. F., St. George.
Klinck, C., O.A.C., Guelph.
Klinck, L., St. Anne de Bellevue, Que.
Knauss, H. L., Detroit, Mich.
Knight, G. E., Sardis, B.C.
Knopf, A. E., Montreal, Que.

Laird, J. O., Blenheim.
La Pierre, L. A., Paris.
Laughland, J., Hartney, Man.
Law, J. F., Solina.
Lawrence, C. A., Stratford.
Le Drew, H. H., O.A.C., Guelph.
Le Lacheur, G., O.A.C., Guelph.
Leslie, F. B., Esquesing.
Lewes, H. S., Summerland, B.C.
Lewis, J. M., Knoxville, Ill.
Lewis, F. G., Toronto.
Lewis, E., Westbrook Mills, N.S.
Lloyd-Jones, J. G., O.A.C., Guelph.
Logan, F. M., Victoria, B.C.

McCalla, Geo., St. Catharines.
McCallum, J. M., Shakespeare.
McCarthy, D. J., Kingston.
McCready, S. B., O.A.C., Guelph.
McDiarmid, H. S., Fingal.
MacDonald, W. T., Stillwater, Okla.
McDonald, J. C., Montreal, Que.
McEwen, C. F., Byron.
McGill, H. W., Everett.
McGrath, G. F., Easton's Cors.
McKenney, A., Corinth.
McKenzie, D. A., Queen Hill.
McKenzie, N. D., Galt.
McLaren, A., O.A.C., Guelph.
McLaren, P S.., McGarry.
McLennan, A. H., Trafalgar.
McMeans, A., O.A.C., Guelph.
McRae, D. E., Cumberland.
McVannel, A. P., St. Marys.

Mallory, F. R., Frankford.
Manton, G., Eglinton.
Marsh, G. F., Guelph.
Mason, A., O.A.C., Guelph.
Metcalfe, I. F., Burford.
Middleton, W. A., Vernon, B.C.
Millen, F. E., O.A.C., Guelph.
Miller, N. E., Creek Bank.
Miller, H. H., Calgary, Alta.
Mills, R. N., O.A.C., Guelph.
Mills, P. G., Sussex, N.B.
Monteith, Hon. N., Toronto.
Mooney, J. A., Valley River, Man.
Moore, R. R., Norwich.
Moorhouse, L. A., Stillwater, Okla.
Moorehouse, R., Cairo.
More, Jas., Kirkton.
Morrison, G. F., Hartney, Man.
Munroe, W. A., Edmonton, Alta.
Murray, C., Avening.
Murray, J. K., Avening.
Murray, Browne O., O.A.C., Guelph.

Newhall, W. H. F., Toledo, Ohio.
Newman, L. H., Ottawa.
Newton, J. N., Limehouse.
Neville, S. J., Cottonwood, Sask.
Nicholson, C., Mt. Forest.
Nixon, C. C., St. George.

Oliver, D. M., Toronto.
Ormiston, W. S., Columbus.
Owen, W. C., Thornton.
Owen, W. H., Hull, Eng.

Packard, R., Brockton, Mass.
Palmer, W. E., Marshville.
Palmer, B. G., Norwich.
Partridge, A. W., Crown Hill.
Patch, A. M. W., O.A.C., Guelph.
Peart, H. S., Jordan Harbor.
Peer, W. M., Freeman.
Petrie, C. M., Guelph.
Pipes, A. S., Moose Jaw, Sask.
Potter, W. F., Manotick.
Prittie, R. D., Moosomin, Sask.
Putnam, G. A., Toronto.

Ralph, C. H., O.A.C., Guelph.
Raynor, T. G., Ottawa.
Reed, F. H., Georgetown.
Reed, Percy, Georgetown.
Reek, W. R., Romney.
Revell, K., Walkerton.
Reynolds, J. B., O.A.C., Guelph.
Rive, H., Dundalk.
Robertson, W. H., Barrington Passage, N.S.
Robertson, C. L., O.A.C., Guelph.
Robertson, G. A., St. Catharines.
Robinson, J. D., Washington, D.C.
Rose, D. M., O.A.C., Guelph.
Ross, J. G., Montreal, Que.
Rowe, Chas. A., Langhorne, Pa.
Ryan, W., O.A.C., Guelph.

Sager, J. L., St. George.
Salkeld, D. G., Goderich.
Sanders, G. E., Roundhill, N.S.
Scott, H. W., Lancaster.
Shantz, A., Waterloo.
Shield, G., Mount Pleasant.
Shopland, N. J., Goderich.
Shuh, C. H., Waterloo.
Singleton, W., O.A.C., Guelph.
Sirett, H., Rosseau.
Slater, A. E., O.A.C., Guelph.
Slater, J. A., Galt.
Smith, A. S., Chesterville.
Smith, L., Braemar.
Smith, R. B., Columbus.
Smye, G. C., Ayr.
Spencer, J. B., Ottawa, Ont.
Springer, S., O.A.C., Guelph.
Squirrell, Wm., O.A.C., Guelph.
Squirrell, W. J., O.A.C., Guelph.
Stafford, E., Toronto.
Steele, W. D., Toronto.
Stewart, W. F., Strath Gartney, P.E.I.
Stott, L., Wyevale.
Stratton, R. W., O.A.C., Guelph.
Strong, W., O.A.C., Guelph.

Taylor, G., O.A.C., Guelph.
Taylor, S., Todmorden.
Taylor, F., Cumberland Mills, Que.
Taylor, W. R., Smithville.
Templer, Wm., Jerseyville.
Thom, C. C., O.A.C., Guelph.
Treherne, R. C., O.A.C., Guelph.
Tucker, H. S., Chapman.
Turney, A. G., O.A.C., Guelph.
Tweltridge, T. H., O.A.C., Guelph.
Twigg, C. B. ,O.A.C., Guelph.

Waddell, W. M., Strathroy.
Walker, Wm., O.A.C., Guelph.
Walker, R. A., North Bay.
Ware, J. T., Allenburg.
Warren, F. B., Gamebridge.
Weaver, J. H., Westfield, N.Y.
Webster, H. B., Science Hill.
Webster, F. E., Creemore.
Weekes, H. M., Glencoe.
Wells, E. A., Chilliwack, B.C.
Westover, C. A., Frelighsburg, Que.
Weylie, D. B., Glanford Sta.
Wheaton, R. R., Thorndale.
Wheeler, H. C., Hubbard, Ohio.
Whetter, W. E., Lorneville.
White, G. G., O.A.C., Guelph.
Whiteside, A. E., O.A.C., Guelph
Wiancko, T. A., Sardis, B.C.
Wiancko, A. T., Lafayette, Ind
Widdicombe, J., Grimsby.
Wilkinson, R. J., Cambray.
Williams, M. L., Sunderland.
Wilson, S., Rolling Dam, N.B.
Wilson, A. C., Aurora, Ill.
Wilson, E. E., Caledon.
Winslow, R. M., Chelsea Green, London.
Wolverton, H. A., Brandon, Man.
Woods, Jno., Jordan Harbor.

Zavitz, C. A., O.A.C., Guelph.
Zavitz, E. J., O.A.C., Guelph.
Zavitz, H. V., Coldstream.

THE ONTARIO AGRICULTURAL AND EXPERIMENTAL UNION.

Officers for 1906-1907.

President	J. M. McCallum, Shakespeare.
Vice-President	A E. Shuttleworth, Berlin.
Secretary and Editor	C. A. Zavitz, Agricultural College, Guelph.
Assistant Secretary	J. Buchanan, Agricultural College, Guelph.
Treasurer	H. L. Hutt, Agricultural College, Guelph.
Directors	Hon. N. Monteith, G. C. Creelman, G. A. Brodie, G. A. Putnam, J. O. Laird, L. A. Bowes.
Auditors	H. S. Arkell and R. W. Hodson.

Committees on Experimental Work.

Agriculture	Prof. C. A. Zavitz (Director), J. Buchanan, W. J. Squirrell, A. E. Whiteside and H. G. Bell.
Horticulture	Prof. H. L. Hutt (Director), H. S. Peart and J. W. Crowe.
Poultry	W. R. Graham (Director), G. A. Robertson and W. A. Brown.
Forestry	E. J. Zavitz (Director), R. D. Craig and E. C. Drury.
Chemistry	Prof. R. Harcourt (Director), A. E. Shuttleworth, W. P. Gamble and Geo. McCalla.
Apiculture	R. F. Holtermann (Director), E. M. Husband and C. C. Nixon.

The Ontario Agricultural and Experimental Union.

ANNUAL MEETING.

The twenty-eighth annual meeting of the Ontario Agricultural and Experimental Union was held at the Ontario Agricultural College, Guelph, on Monday, Tuesday and Wednesday, December 10th, 11th and 12th.

The President of the Union, Mr. G. A. Robertson, St. Catharines, Ont., presided over the regular sessions, and Mr. G. C. Creelman, President of the College, at the annual banquet on Tuesday evening.

SECRETARY'S REPORT.

In December of last year Prof. Zavitz was granted leave of absence from duty for the whole of the year 1906, and at the last annual meeting of the Union the writer was appointed Assistant Secretary, and asked to undertake the Secretary's duties during the latter's absence. This work has been conscientiously performed, and while some difficulties have been encountered, on the whole it has been a pleasant and decidedly interesting task, and the experience has been worth much.

Agricultural experiments were first undertaken in a systematic way by members of the Union in 1886. In that year there were only 12 experimenters, but since that time the work has gradually extended until in 1906 in the division of Agriculture alone we have experimenters in every county and district in the Province, numbering in all about 3,700.

In 1894 the co-operative work was extended so as to include Horticultural as well as Agricultural experiments, and in the spring of that year, fruit bushes, etc., were distributed to quite a number of persons for tests on their own farms. This branch of the work has also made steady growth, and 1,150 lots of experimental material were distributed in 1906.

In recent years experiments in Agricultural Chemistry, Farm Forestry, and Poultry Raising have also been undertaken, and in these lines some very good work is now being done.

In 1906 material for co-operative experiments was furnished to about 4,700 farmers in all, but this does not include all of the men engaged in the work. In the division of Horticulture there are many experiments, such as those with bush fruits, which run through a number of years, so that while only 1,150 received material in the spring of 1906, there were about 2,000 actually engaged in experimental work during the year. In the division of agriculture there are also a number of men, conducting experiments with grass and clover crops, who received the seeds a year or two ago. Taking all of these into consideration, we have a total of about 5,700 persons conducting co-operative experiments under the direction of the Union in 1906. Surely this is a vast and important work.

It should be remembered that not all of the men receiving seeds, etc., are equally well qualified for conducting experiments. Some indeed meet with complete failure for one or more years, but many of these are earnest and persistent, and some become very careful and successful experimenters after a few years' experience; and just here is where the greatest value of the work becomes evident.

A large and interesting volume might be made of the comments, suggestions, and words of commendation offered by those who have been successful experimenters; and of the criticisms and excuses of those who have failed. All of these are helpful in showing the directors where changes and improvements may be made in the system of operation.

During the year a number of letters have been received from college and experiment station workers in the United States, which show that the work of the Union is being recognized and its value appreciated on the other side of the line. President R. W. Sylvester of the Maryland Agricultural College, writes as follows:—

"I regard the Experimental Union work as the medium of the closest proximity that any Agricultural College has had to those whom they were called into existence to serve. I have watched your work very closely, and trust that in time we may have an awakening of a similar character in the United States."

It is gratifying to be able to report another very successful year's work, but let us not indulge over much in self congratulation. Let us rather look forward humbly, but hopefully and persistently, to better and greater things in the future.

TREASURER'S REPORT 1906.

RECEIPTS.	
Balance from 1905	$263 40
Membership fees	199 00
Government grant	2,500 00
Total	$2,962 40

EXPENDITURE.	
Agricultural experiments	$1,172 12
Horticultural experiments	807 52
Chemical experiments	49 58
Poultry experiments	43 00
Part expenses annual meeting, 1905	30 00
Part expenses annual meeting, 1906	95 00
Meeting of executive	3 45
Balance due on Panton memorial	31 25
Interest on money borrowed	1 00
Total	$2,232 92
Balance on hand	729 48
	$2,962 40

We undersigned auditors, declare that we have examined the treasurer's accounts and found them correct.

December 8th, 1906.

H. S. Arkell,
R. W. Hodson,
Auditors.

PRESIDENT'S ADDRESS.

By Mr. G. A. Robertson, St. Catharines.

Assembled here on the twenty-eighth anniversary of the establishment of the Ontario Agricultural and Experimental Union, we are apt to forget about the commencement of the Association, the development and steady growth since its start, and the advances made in the different branches of agricultural work in this country in the past few years. Permit me, therefore, to touch on some of these points of past history which some of us may have forgotten, and which still others present know very little about.

In the year 1870, Hon. John Sanfield Macdonald introduced a bill into the Ontario House of Parliament, having for its object the establishment of an Agricultural College. In 1871 a farm was purchased at Mimico, and the Rev. W. F. Clarke was appointed to visit the Agricultural Colleges in the several States of the American Union, and report as to a suitable plan to pursue in reference to the proposed college. A commission was appointed to examine the Mimico farm, and this commission advised the Government to sell it. In 1873 the present farm was bought from F. W. Stone, and a commission of good practical farmers was appointed to report on the best means of adapting the farm to the desired purposes. That commission reported that it recommended the name to be The Ontario Agricultural College and Experimental Farm, that the object of the institution should be to give a thorough training in the theory and the practice of Agriculture and of Horticulture, and that owing to the lack of information obtainable at that time the Government would have to go ahead and to learn by experience. I shall not here mention what that "learn by experience" proved to be. The institution certainly had its ups and downs, but principally downs at first.

In 1884, on the advice of our former President, Dr. Mills, Farmers' Institutes were established. This was a recognition of the necessity of a closer intercourse between the students, the College, and the farmer, and the excellent results of this movement were never more apparent than at the present time.

In the year 1880 the Ontario Agricultural and Experimental Union was formed. The objects of this association were to form a bond of union amongst the officers, students and ex-students of the Ontario Agricultural College, to promote their intercourse with a view to mutual information, to discuss subjects bearing on the wide field of agriculture with its allied sciences and arts, to conduct experiments in this field, in union as far as possible, or by individual efforts, to secure the co-operation of the agriculturists of the country in the work, and to meet at least once a year to hear papers read and addresses delivered by competent parties, and to report upon the labor of the past year. The officers and students of whatever time were eligible to become members upon the payment of the annual fee, and these were eligible to hold office and discuss questions before the association.

In 1884 the Presidents of the Agricultural Societies were made honorary members of the Union, and their presence and advice were of much benefit.

In 1886 the members of the Union started the first co-operative experimental work on their own farms; the nature of the experiments was to test the effect of salt, land plaster or gypsum, and superphosphate on wheat, oats and barley. The results of the experiments cannot be summarized here. The experiments were carried on in different parts of Ontario and on different soils which had been manured differently. The results were of special benefit to the individual experimenters.

In 1887 attention was also given to the advisability of the co-operative testing of varieties of grain, grasses, etc., which had already given high results in the tests at the College. By the introduction of these new or improved varieties there has been a great increase in the quantity and the quality of the products of the farm. Many of our standard varieties now in general cultivation throughout the Province were brought to the homes of the farmers through this phase of the Experimental Union work.

To-day the Experimental department of the College is taking great care in getting improved strains of the best varieties by a method of plant selection and of saving the seed from the plants of the most desirable types. By this process the department is enabled to strengthen the straw of certain varieties of grain, to develop the rust resisting powers of the straw, to increase the yield of grain, and in some cases to hasten the time of maturity. The Experimental department at the College is also busy in the work of hybridization, or of combining the good qualities of some of the best standard varieties in the origination of new grains, as, for example, in the crossing of a heavy yielding variety of wheat such as Dawson's Golden Chaff with a superior milling wheat as Turkey Red or Imperial Amber, and thus trying to originate new varieties which will to a certain extent retain the yielding powers of the former with the better milling qualities of the latter.

As soon as these improved strains, and also the new varieties, have proven themselves to possess superior excellence, and have been produced in sufficient quantities, they will be distributed throughout this Province for further test through the medium of the Experimental Union.

We may call attention to the experiments in horticulture which were started a number of years ago. Some of the standard varieties of strawberries, raspberries, currants, gooseberries, etc., were distributed to farms in the various parts of the Province, and accurate accounts kept from year to year of their yield, hardiness, quality, and dates of maturity. These experiments have done much towards creating an interest among farmers outside of the fruit districts proper, in the possibilities of growing small fruits, and have furnished statistics regarding the adaptability of certain varieties to certain districts. We are hoping that this work will be extended still further. Some time since, the Union received a communication from Mr. R. H. Cowley, inspector of Public Schools for the County of Carleton, who has since been appointed Inspector of Continuation Classes of the Public Schools. He asks from the Union that some thirty or more Rural Schools be allowed to cooperate in the fruit testing experiments. I will quote his words, "Our object is to enrich rural life and strengthen rural schools in the confidence of those who live in the country, but we cannot hope to do this if we continue as in the past to dissociate the work of the Rural Schools from the great fundamental industry of the country." How better could the youth of the land be educated than by training the powers of observation and creating an interest in matters pertaining to the growth of plants.

Yet we have another and newer department in our work, one which bids fair to rival many of the other branches of Agriculture. I refer to the poultry industry. This department started with co-operative experiments on artificial incubation, and soon became aware of many remarkable facts which they were not able to account for. About a year ago last spring, on certain farms devoted largely to hatching poultry by artificial methods, there was a disease quite prevalent known as "white diarrhoea" which carried off quite a large percentage of the chickens hatched, while other farms were comparatively free from the disease. On the farms affected, the chicks hatched by natural methods were not so subject to the disease, and the question is what caused this? The Poultry and Physics departments at the College have been working together in an attempt to determine wherein the incubator differs from the hen. The results are as follows: the temperature under the hen is lower than that at which some incubators are recommended to be run, there is a much larger percentage of carbonic acid gas, and also a much higher percentage of moisture under the hen than in the average incubator. Under natural methods this carbonic acid gas and moisture turns the carbonate of lime composing the egg shell into a bicarbonate which is soluble, and the shell rots or softens so that the chick is enabled to extricate itself more easily. Is this an answer to "Why do the chicks stick in the shell? We ask for co-operative work along other lines as follows: The powers of a good laying hen to transmit her good laying qualities to her offspring; the causes of sterility in eggs or the inhatchability of eggs laid by certain hens; to what extent fertility in eggs is hereditary; the best methods of housing, rearing, and feeding for certain results, etc.

It has been suggested that the Union should undertake co-operative work in the testing of vegetables. This is a field where the inestimable value of seed selection, the judicious use of fertilizers, and the effect of spraying for insect and fungous diseases could be demonstrated and much necessary information gained. The day is not far distant when our vegetables and fruit trees will be propagated from healthy stock of the proper type and good bearing qualities, and when the many haphazard methods now employed in the production of seeds and seed grains and nursery stock will be a thing of the past. The same care must be taken in the propagation of plants, which has been taken to produce the splendid specimens of live stock we see to-day.

The demand for quality in an article was never more apparent than at the present time. Labor is scarce, competition is keen, and success depends on the necessary attention given to the details which insure the maximum crop with the minimum of labor. We have ever increasing fungous and insect pests which, if unmolested, will often ruin an entire crop. We must study the demands of the market and study our own soil. To market successfully, co-operation among growers has in some cases become almost an absolute necessity, especially in putting our products in the newer and distant markets.

Co-operation has also been largely instrumental in the improvement of dairying in this country. What would the dairy industry be to-day if the methods of twenty years ago were followed? Then, there was no uniform method of work, and much of the cheese and butter which was produced was unfit for market, but now the dairy stock has been improved, the methods of feeding and housing have been improved, absolute cleanliness has overcome many of the "off flavors" in the milk and its products, and Canadian cheese and butter is of the best.

What the future of the fruit, vegetable, and poultry industries will be, depends on ourselves. The Ontario Government has always been willing to aid properly directed co-operative work in the advancement of agriculture. We should not be content to congratulate ourselves on our past efforts, we should profit by the mistakes of the past.

It is the duty of each student and ex-student to lend a helping hand. We thank the many experimenters in all parts of the Province for their valuable assistance, and those in other walks of life for their encouraging interest.

RESULTS OF CO-OPERATIVE EXPERIMENTS IN AGRICULTURE.

By J. Buchanan, Agricultural College, Guelph.

In presenting the report of the co-operative work in agriculture for 1906, I am pleased to be able to state that we have had another most satisfactory year's work. A very large number of reports have been received, and a goodly percentage of these give evidence of decidedly careful work, close observation, and much interest evinced on the part of the experimenters. We now have a large number of ex-students and others who have conducted experimental work successfully for a number of years, and are becoming so trained in the work that they are doing service not only to themselves but to the country as a whole. The experimenters deserve much credit for their work, and the farmers as a whole owe much to these men who are reporting the results of their investigations from year to year.

For the benefit of those who are not familiar with our system of co-operation, it may be well to state that it is to some extent an outgrowth of the experimental work done at the College, and that it is in large measure based on the results of that work. The work of carrying on experiments with farm crops at the College was commenced in 1876, and since that time it has gradually developed along various lines until at present about 2,000 plots are used annually in growing grains, fodder crops, grasses, clovers, roots and potatoes, with the object of obtaining information regarding the best varieties, the most productive selections of seed, the best time to sow the various classes of crops, the most improved methods of cultivation, etc. Since the beginning of this work, a very large number of varieties of all classes of farm crops have been tested, and the best among these are now used for distribution in connection with the co-operative work of the Experimental Union.

In the spring of each year, circulars outlining the co-operative work are distributed by the agricultural committee appointed by the Union. These circulars give a list of all the experiments for which material can be furnished, and each farmer in the Province who sees this list is privileged to select any one experiment, and on sending his application to the College he will receive material for the test which he has chosen. These circulars are sent by mail to the officers and members of the Experimental Union; to the experimenters of former years who have done satisfactory work; to leading farmers, gardeners, and others, whose names have been suggested by secretaries of Farmers' Institutes, secretaries of Agricultural Societies, principals of Collegiate Institutes, inspectors of Public Schools, etc. They are also sent to all persons writing for information regarding the co-operative work, and to all the newspapers of the Province. Most of the newspaper editors are kind enough to print the list of experiments in at least one of their weekly issues; hence it is brought to the notice of a very large proportion of the farmers of Ontario.

During the past year, we have had experimenters in every county and district of the Province, and it is gratifying to notice that a large number of farmers in the newer settlements are taking hold of the work with even greater zest than those in the older districts. The following table gives the list of thirty experiments with spring sown crops and five experiments with autumn sown crops, for which material was furnished to the experimenters in 1906; it also indicates the number of plots required for each experiment.

Co-operative Experiments in Agriculture in 1906.

Grain Crops.

		Plots.
1.	Testing three varieties of Oats	3
2.	(*a*) Testing three varieties of six-rowed Barley	3
	(*b*) Testing two varieties of two-rowed Barley	2
3.	Testing two varieties of Hulless Barley	2
4.	Testing two varieties of Spring Wheat	2

	Plots.
5. Testing two varieties of Buckwheat	2
6. Testing two varieties of Field Peas	2
7. Testing Emmer and Spelt	2
8. Testing two varieties of Soy, Soja, or Japanese Beans	2
9. Testing three varieties of Husking Corn	3

Root Crops.

10. Testing three varieties of Mangels	3
11. Testing two varieties of Sugar Beets for feeding purposes	2
12. Testing three varieties of Swedish Turnips	3
13. Testing Kohl Rabi and two varieties of Fall Turnips	3
14. Testing Parsnips and two varieties of Carrots	3

Forage, Fodder, Silage and Hay Crops.

15. Testing three varieties of Fodder or Silage Corn	3
16. Testing three varieties of Millet	3
17. Testing three varieties of Sorghum	3
18. Testing Grass Peas and two varieties of Vetches	3
19. Testing two varieties of Rape	2
20. Testing three varieties of Clover	3
21. Testing Sainfoin, Lucerne and Burnet	3
22. Testing seven varieties of Grasses	7

Culinary Crops.

23. Testing three varieties of Field Beans	3
24. Testing three varieties of Sweet Corn	3

Fertilizer Experiments.

25. Testing fertilizers with Corn	6
26. Testing fertilizers with Swedish Turnips	6

Miscellaneous Experiments.

27. Sowing Mangels on the level and in drills	2
28. Testing two varieties of early, medium, or late Potatoes	2
29. Testing three grain mixtures for grain production	3
30. Testing three mixtures of Grasses and Clover for hay	3

AUTUMN SOWN CROPS.

1. Testing Hairy Vetches and Winter Rye as fodder crops	2 plots.
2. Testing three varieties of Winter Wheat	3 “
3. Testing five fertilizers with Winter Wheat	6 “
4. Testing autumn and spring applications of nitrate of soda and common salt with Winter Wheat	5 “
5. Testing two varieties of Winter Rye for grain production	2 “

Most of the plots were one rod wide by two rods long, being exactly one-eightieth of an acre in size; some, however, were only one rod square. In past years, some plots consisting of one-tenth of an acre and a few which were one-half acre in size were used, but these were found less satisfactory than the small plots. For the following summary, only the results given in the most reliable reports were used. It should be remembered, however, that while only these are used for publication many of those not included as successful experiments would be of much value to the individual experimenters. It frequently happens, that, owing to some unavoidable accident, an experiment may be to some extent injured so that the results cannot be used in the general summary, and yet this experiment may have furnished useful lessons to the farmer conducting it, and in all cases the experimenters obtain much more information from the work which they have carried on than can be given in a tabulated report.

The average results of the successful co-operative experiments with grain crops are presented in the following table:

Grain Crops, 1906.

Experiment.	Varieties.	Comparative value.	Yield per Acre.		
			Straw (tons)	Grain (lbs.)	Grain (bush)
Oats (104 tests)	Siberian	100	1.44	1,740	51.18
	Imported, No. 534	81	1.41	1,716	50.47
	Daubeney	70	1.39	1,606	47.22
Six-rowed Barley (57 tests)	Mandscheuri	99	1.14	1,822	37.95
	No. 21	100	1.12	1,801	37.52
	Oderbrucker	79	1.14	1,733	36.10
Two-rowed Barley (3 tests)	Two-rowed Canadian	100	1.04	1,146	23.88
	French Chevalier	50	1.20	906	18.88
Hulless Barley (14 tests)	Guy Mayle	100	1.33	1,331	22.19
	Black Hulless	80	1.25	1,320	22.00
Spring Wheat (23 tests)	Wild Goose	100	1.87	1,451	24.19
	Red Fife	94	1.50	1,264	21.07
Emmer and Spelt (11 tests)	Common Emmer	100	1.23	1,578	39.46
	Red Spelt	59	1.00	1,106	27.64
Buckwheat (3 tests)	Japanese	100	1.71	1,334	27.78
	Silver Hull	50	1.72	934	19.45
Field Peas (55 tests)	Early Britain	96	1.55	1,427	23.79
	New Canadian Beauty	100	1.74	1,422	23.69
Field Beans (17 tests)	White Wonder	100	.80	1,203	20.05
	Narrowfat	97	.97	1,203	20.05
	New Prize Winner	100	.80	1,196	19.93
Soy Beans (1 test)	Early Yellow	100	1.27	980	16.33
	Medium Green	50	1.75	580	9.67
Winter Wheat (17 tests)	Banatka	100	2.16	1,801	30.01
	Early Genesee Giant	76	1.94	1,532	25.54
	Crimean Red	76	1.91	1,526	25.48
	Imperial Amber	92	1.93	1,406	23.43
	Dawson's Golden Chaff	96	1.69	1,295	21.58
			whole crop.		
Corn for Grain (16 tests)	Compton's Early	100	14.26	3,369	60.16
	Salzer's North Dakota	91	14.32	3,278	58.54
	King Phillips	91	13.60	3,217	57.44
			straw.		
Mixtures (12 tests)	Daubeney Oats, 34 lbs. per acre Mandscheuri Barley, 48 lbs. per acre	100	1.37	1,505	......
	Siberian Oats, 25 lbs. per acre Chevalier Barley, 35 lbs. per acre Wild Goose, Spring Wheat, 22 lbs. per acre	71	1.50	1,478	......
	Siberian Oats, 34 lbs. per acre Chevalier Barley, 48 lbs. per acre	68	1.32	1,462	......

The first column of figures in this table represents the comparative value of the varieties as estimated by the experimenters themselves. In making this comparison all the characteristics of the varieties were taken into consideration. The yield of straw, as given in the second column, represents the total crop less the amount of grain, and therefore includes the chaff with the straw. The yield of grain is given in pounds, and also in bushels per acre, in order that the results may be more clearly understood, and that comparisons may be made between the different classes of crops as well as between the varieties of each class. Owing to the great variation in the weight per measured bushel of the different crops, it is easier to compare the results in pounds than in bushels per acre.

Oats. Of the three varieties of oats distributed for co-operative experiments in the spring of 1906, the Siberian and Imported No. 534 are among the later and heavier yielding kinds which have been tested at the College. The Daubeney is an early variety which is quickly becoming popular among Ontario farmers for the production of oats for use early in the season. It will be noticed that the experimenters have placed the Siberian first in comparative value, and that this variety has also given the largest yield of both grain and straw. The Siberian variety is so commonly grown and so well known throughout the Province that further comment upon it is unnecessary. The Imported No. 534 is one which has given excellent results on our own trial grounds during recent years, and the Daubeney is found to be a very satisfactory variety for growing with six-rowed barley for the production of mixed grain for feeding purposes.

Six-rowed Barley. There were many more applications for this experiment in 1906 than in previous years, owing to the fact that No. 21, a new strain of the Mandscheuri variety, originated at the College, was included in the test and many farmers were anxious to get seed of this new strain. Fifty-seven successful reports were received in all, and it is interesting to notice that while the original Mandscheuri gave a slightly higher yield of grain than the No. 21, the latter was placed first in comparative value. The No. 21 produced stronger and more vigorous looking plants than the Mandscheuri, and no doubt it was owing to its fine appearance that most of the experimenters placed it first in comparative value. It should be stated here that these two kinds of barley were grown close together on the trial grounds at the College in 1906, and among the thousands of farmers who saw them in the month of June, not one thought that the Mandscheuri was equal to the No. 21. Whether this new strain will prove to be superior in yielding powers as well as in appearance in the future, remains to be seen.

Two-rowed Barley. While the two-rowed barleys do not, as a rule, produce quite as much grain as the six-rowed varieties, the grain is usually of better quality. During the past four or five years some of the leading two-rowed kinds have yielded almost as well as the better six-rowed sorts in the tests at the College. For these reasons, we decided to distribute samples of two very distinct varieties of two-rowed barley for co-operative tests in 1906. Unfortunately only a small number of applications were received for material for this test, and only three good reports came to hand in the fall. On averaging these three, we find that the Two-rowed Canadian variety produced five bushels per acre more than the French Chevalier, and was also placed first in comparative value by the experimenters. The Two-rowed Canadian has a strong upright straw and short erect heads, while the Chevalier is very weak in the straw and almost invariably lodges badly before it is ripe. It is stated by English authorities that the varieties of barley belonging to the Chevalier type produce grain which is superior in quality for malting purposes to that produced by any other class of barley. Owing to the fact, however, that it has weak straw and long slender nodding heads and is a comparatively poor yielder, it is not likely to become popular with the farmers of Ontario.

Hulless Barley. The same two varieties of hulless barley were distributed in 1906 as in 1905, but while the Black Hulless gave a slightly higher yield than the Guy Mayle in 1905, the order has been reversed in the past season, and the Guy Mayle stands first both in yield and in popularity. Both of these varieties have been tested at the college for quite a number of years, and the Guy Mayle is found to produce a stiffer straw and usually a larger yield of grain than the Black Hulless. It is not yet so commonly grown however, and there is therefore greater difficulty in securing good seed in quantity.

Spring Wheat. The Wild Goose and Red Fife varieties of spring wheat were again distributed to the experimenters in 1906, and the Wild Goose gave the larger yield of the two, but the difference is somewhat less than it usually is. In 1905 the Wild Goose produced 12.18 bushels per acre more than the Red Fife in the average of the co-operative tests, while in 1906 the difference was only 3.12 bushels. It is interesting to notice that both in the co-operative work throughout the Province and in our own tests made at the College, the varieties of common or flour producing wheat gave considerably larger yields in 1906 than in 1905, while the varieties of macaroni wheat, such as the Wild Goose, yielded much more heavily in 1905 than in 1906. Both Wild Goose and Red Fife are well known and commonly grown in most parts of Ontario, and according to continuous tests made at the College they still stand among the very best varieties in their respective classes.

Emmer and Spelt. While there is not a very great demand for material for the Emmer and Spelt experiment, still eleven first-class reports were received in the autumn of 1906, and the adjoining table shows the usual wide difference, both in yield of grain and in general popularity. It may seem to some of the experimenters that it is useless to continue distributing Spelt for experimental purposes, but the difference in the character and in the actual value of these two classes of crops is not yet generally known throughout the Province, and we are anxious to have both grown in a small way in as many parts of the Province as possible in order that farmers in all localities may become familiar with them and see for themselves the superiority of Emmer over Spelt. The chief difference between these from an economic standpoint are that the Emmer is very much more productive and has a much smaller percentage of hull, and consequently a higher feeding value.

Buckwheat. Only three good reports were received of the test with two varieties of buckwheat. The Japanese stands first with a yield of 27.78 bushels per acre, and the Silver Hull second with a yield of 19.45 bushels. In both cases the amount of grain produced was much less than in 1905. The present year's results show a greater difference in the productive powers of the two varieties than is generally found to exist, either in the co-operative work or in the tests at the Experimental Station at Guelph. The Japanese produces seed of large size and dark color, while the Silver Hull has a smaller seed of a silvery shade.

Field Peas. For the past few years we have sent peas only to those districts where the pea weevil has not yet been found, but in 1906, owing to the fact that the pea weevils were becoming less troublesome, it was decided to send peas for experimental purposes to all parts of the Province from which applications were received. In consequence of this, we received a much larger number of good reports than in 1905. On averaging the results of the fifty-five first-class reports which came to hand, we find that the Early Britain stands first in yield of grain with 23.79 bushels per acre, and the New Canadian Beauty second with 23.69 bushels. Notwithstanding the fact that the Early Britain gave a slightly higher yield of grain, the New Canadian Beauty was placed first in comparative value in the estimation of the experimenters. Both kinds make a vigorous growth and are well suited for growing on most soils. The Early Britain is a somewhat shrunken pea of greyish brown color, and the New Canadian Beauty a large round white pea.

Field Beans. The three varieties of field beans used in connection with the co-operative experimental work in 1906 were White Wonder, Marrowfat and New Prize Winner. The first two named were equal in yield with 20.05 bushels of grain per acre, and the New Prize Winner third with 19.93 bushels. The White Wonder and New Prize Winner are small white beans, useful for the general market. The two varieties look very much alike and the experimenters placed them equal in comparative value.

Soy Beans. Only a few farmers conducted the experiment with Soy beans, and just one good report was received. By examining the foregoing table, it will be seen that the Early Yellow variety produced about six and one-half bushels of grain per acre more than the Medium Green. The Early Yellow is a variety which usually produces well matured seed at Guelph, but the plants are small as compared with those of the Medium Green. The former is likely to be used for the production of grain for feeding purposes, and the latter for the production of fodder or ensilage.

Winter Wheat. The results of the experiments with autumn sown crops, conducted both at the College and throughout Ontario during the past year, were reported in a circular which was distributed through the mails and published in the newspapers about three weeks before seeding time in the autumn, and no doubt this circular has been read by a great many farmers. In the autumn of 1905, five varieties of winter wheat were sent to those who made application, and the average results of the tests with these varieties are presented in the table in this report. Notwithstanding the fact that the Dawson's Golden Chaff and Imperial Amber gave smaller yields of grain than the other three varieties, they have first and second places in popularity with the experimenters; the Dawson's being the most popular probably because of its clean strong straw. The Banatka which stood first in yield of grain was third in popularity. This is a hard red wheat of good milling quality, but produces rather weak straw, and therefore lodges considerably, especially in wet seasons.

Winter Rye. Of the three varieties of winter rye distributed in the autumn of 1905, the Mammoth stood first in average yield of grain with 41.1 bushels per acre, the Thousand Fold second with 32.9 bushels, and the Common third with 31.8 bushels. These three varieties are very much alike in most respects, though differing somewhat in yield.

Corn for Grain. For the past three seasons, the Compton's Early, Salzer's North Dakota, and King Phillip varieties of corn have been used in the co-operative tests for the production of matured grain. The yields during the past year were considerably higher in each case than in the year 1905, yet the varieties held the same relative positions. By referring to the table, it will be seen that the Compton's Early is placed first in comparative value with one hundred points, and the other two varieties equal with ninety-one points each. All have produced splended crops of grain and the difference between the varieties is not great.

Mixtures for Grain Production. As a result of conducting extensive experiments with a large number of mixtures of grain for the production of grain for feeding purposes at the College, it has been found that a mixture of barley and oats has given a larger yield of grain than any other combination, and a larger yield than any kind of grain grown separately. We have also learned that one bushel per acre of each is about the right quantity to sow in order to produce the largest possible crop. In addition to this, we have found that certain varieties of barley and oats can be grown together to good advantage, because they mature at about the same time. In order to get further evidence along these lines and to create an interest in the growing of mixed grains, among the farmers of the Province, we have distributed three mixtures for co-operative tests: the first consisting of Daubeney oats and Mandscheuri barley, to be sown at the rate of one bushel of each per acre, the second a mixture of Siberian oats and Chevalier barley, to be sown at the same rate, and the third a mixture of Siberian oats, Chevalier barley and Wild Goose wheat, to be sown at the rate of twenty-five pounds, thirty-five pounds, and twenty-two pounds per acre respectively. Eleven good reports of this test were received in 1905, and twelve in 1906. In each case the early mixture consisting of Daubeney oats and Mandscheuri barley gave the heaviest yield and stood first in the estimation of the experimenters for use on their farms. The results of all these tests may be seen in referring to the foregoing table.

FIELD ROOTS AND FODDER CROPS.

Experiments.	Varieties.	Comparative value.	Yield per Acre.
			Tons.
Mangles (7 tests)	Yellow Leviathan	100	42.66
	Sutton's Mammoth Long Red	62	39.97
	Steel Briggs' Giant Yellow Globe	69	36.93
Sugar Beets (7 tests)	Giant White Feeding	100	39.13
	Royal Giant	62	32.62
Swede Turnips (6 tests)	Sutton's Magnum Bonum	100	20.83
	Hartley's Bronze Top	82	19.76
	Kangaroo	55	18.42
Carrots and Parsnips (5 tests)	Mastadon White Intermediate Carrot	73	18.26
	Bruce's Mammoth " "	100	17.30
	Buckbee's New Sugar Parsnips	45	14.79
Fodder Corn (4 tests)	Henderson's Eureka	50	16.75
	Leaming	90	14.64
	White Cap Yellow Dent	100	14.30
Millet (5 tests)	Japanese Barnyard	100	12.03
	Japanese Panicle	85	11.01
	Hungarian	46	7.87
Sorghum (1 test	Kaffir Corn	100	9.80
	Early Minnesota Sugar Cane	67	9.24
	Early Orange " "	33	6.00
Grass Peas and Vetches (3 tests)	Hairy Vetches	86	7.87
	Grass Peas	100	7.31
	Common Vetches	100	6.75
Rape (1 test)	Dwarf Bonanza	100	25.48
	Dwarf Essex	50	22.72

Mangels. The three varieties of mangels used in the co-operative work in 1906 represent three distinct types; namely, the long, the intermediate, and the globe. The Yellow Leviathan variety which gave the largest number of tons of roots per acre, also stood highest in yield in the co-operative tests of 1905 and 1904. These three kinds are among the best of their respective types. The experimenters therefore have an opportunity of deciding for themselves which class of mangels is likely to give the best satisfaction on their respective farms. By referring to the foregoing table it will be seen that the Yellow Leviathan not only gave the largest yield, but was decidely the most popular variety with the experimenters.

Sugar Beets for Feeding Purposes. The same two varieties of sugar beets were used for co-operative tests in 1905 and 1906, the Giant White Feeding giving a yield of about six and one-half tons per acre more than the Royal Giant in 1906. The Giant White Feeding is a comparatively new variety which has been under test at the College for only a few years. The roots of this variety are white with a greenish top, while the Royal Giant is of a pink shade above the ground.

Swede Turnips. Only six good reports of the test with three varieties of swedes came to hand in the autumn of 1906. On averaging these six, we find that the Sutton's Magnum Bonum produced 20.83 tons of roots per acre, the Hartley's Bronze Top 19.76, and the Kangaroo 18.42. The Sutton's Magnum Bonum is a smooth round variety of fine appearance and is quickly becoming a favorite in this country. The Hartley's Bronze Top is another globe variety, while the Kangaroo is somewhat cone shaped, tapering gradually towards the root.

Carrots and Parsnips. It has been the rule for the past few years to send out one variety of parsnips along with two of carrots, in order that farmers might see for themselves the comparative yielding powers of these two classes of roots. The Mastadon White Intermediate carrot has been the leader in this test for the past two years and is also one of the very best varieties grown at the College. By examining the table, it will be found that the difference in yield between the two varieties of carrots is not great, but the parsnip has given a considerably lower yield than the carrots, both in 1905 and 1906.

Fodder Corn. On averaging the results given in the four good reports on the fodder corn test, we find that while the Henderson's Eureka produced over two tons of fodder per acre more than either of the other varieties, still it stands lowest in the estimation of those conducting the test. The explanation of this seeming inconsistency lies in the fact that the first mentioned variety grows very tall and produces a large bulk of stalk and leaf. It also produces a good proportion of ears, but these do not, as a rule, reach a sufficiently advanced stage of maturity to make ensilage of the best quality. On the other hand, the White Cap Yellow Dent and Leaming varieties mature at an earlier date, and while they do not give as large a total yield there is a larger proportion of ears, and these are well enough matured to give the ensilage a much better quality; that is, a higher feeding value.

Millet. The three varieties of millet furnished to the experimenters have given somewhat poorer results during the past year than they did in 1905. The Japanese Barnyard stands first with a yield of 12.03 tons of green crop per acre in 1906, while the same variety produced 16 tons per acre in 1905. It is interesting to notice the superiority of the two Japanese varieties over the Hungarian, which is so commonly grown on the farms of this Province.

Sorghum. There is but a slight demand for material for the experiment with three varieties of sorghum. It is not probable that this class of crop will come into general use in Ontario, since it requires at least as long a season to reach maturity as the better varieties of corn, and does not, as a rule, produce nearly such a large amount of fodder per acre. Contrary to expectations, the Kaffir Corn took first place in yield in 1906, while the Early Minnesota Sugar Cane stood second with about one-half ton per acre less than the amount produced by the Kaffir Corn. The saccharine varieties, commonly called sugar canes, generally produce considerably larger crops than the Kaffir Corn.

Grass Peas and Vetches. For the past few years Grass peas and two varieties of vetches have been used in the co-operative work. On examing the accompanying table, it will be found that while the Hairy vetches produced the largest amount of green crop, they have not met with the approval of the experimenters, since they are placed lowest in comparative value. This may be due to the fact that they are not quite so freely eaten as the Grass peas and common vetches. In the southern part of the Province the Hairy vetches can be sown to best advantage in the autumn, but at Guelph and in districts farther north the crop is considerably winter killed and can therefore be more profitably sown in the spring, especially when the crop is intended for the production of fodder.

Rape. Only one good report of the experiment with two varieties of rape was received in the autumn of 1906, and in this test the Dwarf Bonanza produced about two and three-quarters tons of green rape more than the Dwarf Essex. These two varieties of rape very closely resemble each other, and it is likely that if a large number of reports had been received there would not have been so much difference in the yield.

Clovers. For a number of years, three varieties of clover have been distributed to different parts of the Province for co-operative tests. The experiments with these crops will be chiefly valuable to the individuals conducting them. Owing to the fact that they are perennials, which continue to produce crops for several years, it is very difficult to get satisfactory reports which can be summarized in a way suitable for presentation to the public. However, as these experiments furnish useful object lessons for the experimenters themselves, it is deemed advisable to continue to send out seeds of Common Red Clover, Mammoth Red clover, and Alsike to those who wish to experiment with them.

Perennial Crops. Another experiment which is of value chiefly to the individual experimenters is one with Lucerne, Sainfoin, and Burnet. In general, it may be said that the Lucerne is giving good satisfaction in many parts of Ontario. If sown on well drained soil it usually produces three or four good crops each year, and the fodder or hay made from it is of high feeding value when properly handled. Lucerne can be most profitably grown as a soiling crop,since it gives a continuation of green fodder throughout the season. The Sainfoin and Burnet are not proving so satisfactory for general cultivation as the Lucerne, but might be used to advantage for certain specific puropses.

Autumn Sowing of Winter Rye and Hairy Vetches for Fodder Purposes. For the production of fodder, Hairy vetches and Winter Rye were grown this year for the fourth time. Several reports of this experiment were received, but as the Vetches were completely winter killed in most places, no good comparison of the yields can be made. In several tests, Winter Rye gave very good results. The experimenters report that these crops were fed to different classes of animals; in general, the Vetches were relished by all kinds of stock, but the Rye was not freely eaten, excepting by horses.

SWEET CORN, 1906.

As sweet corn is grown by all classes of people, there are quite a large number of applications for seed each year. In the spring of 1906, seed of the Ringleader, Golden Bantam, and Mammoth White Cory varieties were sent out for test, and twenty good reports of this experiment were returned in the fall. The following table gives the average number of ears produced by each variety, the average number of days required for the corn to reach the stage in which it can be used for table purposes, and an estimate of the table quality and the comparative value of the different kinds.

Experiment.	Varieties.	Comparative value.	Table quality.	Comparative number of ears.	Number of days until ready for table use.
Sweet Corn (20 tests)..	Ringleader	100	88	158	70
	Golden Bantam................	84	100	158	73
	Mammoth White Cory........	100	93	159	74

It will be seen that the number of ears produced by these varieties is almost exactly equal, and that the Golden Bantam is placed first in table quality. It is therefore difficult to understand why the last named variety should be placed much lower in comparative value than the other two. The explanation of this may be found in the fact that the Golden Bantam produces small ears of yellow color, while the Ringleader and Mammoth White Cory produce larger ears which are white in color and are therefore better suited for the general market. The Golden Bantam is a very palatable corn, and will therefore stand high in the estimation of many people who prefer quality rather than quantity.

METHOD OF SOWING MANGELS.

For a number of years, experiments have been conducted at the College to determine whether it was better to sow the seeds of root crops on drills or on the level ground. In the majority of cases it was found that a larger crop of roots was produced when the seeds were sown on the level. In order to confirm the results of these tests and to bring the matter more prominently before the farmers, it was decided to include an experiment of this kind among the co-operative tests for 1906. For this purpose, mangel seed was distributed to a number of applicants, but only one good report of this test was received. In this one test, however, the results are similar to those obtained at the College on our own trial grounds, the plot on which the seed was sown on the level ground producing a yield of 33.3 tons of roots per acre, as compared with 30.7 tons per acre from the drilled plot.

FERTILIZER EXPERIMENTS.

As considerable co-operative work has been done along the line of testing a number of fertilizers with various classes of spring crops, a table is here presented which gives a summary of the results of all the experiments conducted within the past fourteen years, including the tests of fertilizers with corn in 1906.

Kind of fertilizer used.	Fertilizer per acre.	Average yield per acre.				
		Oats.	Mangels	Fodder Corn.		Swede Turnips
		5 years. 74 tests.	5 years, 41 tests.	Whole crops, 8 years, 47 tests.	Husked ears, 8 years, 41 tests.	4 years, 12 tests.
	lbs.	bus.	tons.	tons.	tons.	tons.
Nothing	....	38.9	20.6	8.2	2.7	21.9
Nitrate of soda	160	46.3	26.5	9.4	3.1	24.1
Superphosphate	320	43.6	24.2	9.0	3.1	24.9
Complete fertilizer	213	48.7	25.4	9.4	3.2	25.9
Muriate of potash	160	43.8	24.6	9.4	3.0	27.2
Cow manure	40,000	....	....	....	....	30.1

OATS, MANGELS, FODDER CORN AND SWEDE TURNIPS.

In each of the years, both the fertilizers and the seeds have been sent from the College to the experimenters. In every instance, the nitrate of soda and the muriate of potash have been applied at the rate of 160 pounds per acre and the superphosphate at the rate of 320 pounds per acre. The mixture, or complete fertilizer, has been composed of one-third of the amount of these fertilizers, making in all 213⅓ pounds. In all cases, the nitrate of soda has been applied when the plants were about three inches in height, and the muriate of potash and the superphosphate at the time of sowing the seed. The cost price of each of the fertilizers would be about $4.60 per acre. Farmyard manure has been used in the experiments of the past five years. The advice of each experimenter has been to apply 500 pounds of average cow manure per plot, the application being equal to twenty tons per acre. The cow manure has been mixed with the soil to a depth of from four to five inches, and the fertilizers have been stirred in the soil to a depth of from one to two inches.

In connection with the co-operative work, experiments have been conducted with fertilizers on oats for five years, on mangels for five years, on corn for eight years, and on swede turnips for four years. The results for 1906 are confined to the experiments with fertilizers on corn.

Fertilizers with Corn. In the average of the experiments in applying fertilizers with corn in each of eight years, during which time forty-seven complete and satisfactory reports were received, it will be seen that the yields of whole crop produced by the plots which received an application of nitrate of soda, muriate of potash, and complete fertilizer were equal, while the plot on which superphosphate was applied produced nearly half a ton less than the others, and that the largest yield of husked ears was obtained when complete fertilizers was applied to the land.

Fertilizers with Swede Turnips. On averaging the results given in all the reports on the test of fertilizers with swede turnips, we find that barnyard manure has been instrumental in producing the largest yield of roots, and that the complete or mixed fertilizer stands second in this respect. It should also be observed that the superphosphate has given the best results among the individual commercial fertilizers. This goes to confirm the general opinion that phosphatic fertilizers can be more profitably applied to turnip land than either nitrogenous or potassic fertilizers.

Fertilizers with Mangels. During the five years in which fertilizers were used with mangels, forty-one good reports of successfully conducted experiments were received. These show that the smallest average yield was produced from the unfertilized plot, namely, 20.6 tons per acre, and that the largest average yield was produced from the nitrate of soda, namely, 26.5 tons per acre. As in the case with corn, the unfertilized land gave the lowest yield in each year. The nitrate of soda produced the highest yield in four out of five years. The average of 197 bushels of mangels per acre produced by the nitrate of soda over the unfertilized land was obtained at a cost of about 2.3 cents per bushel. The nitrate of soda produced the largest yield on both heavy and light soils, but on the black loams the muriate of potash gave the highest yield of mangels. The nitrate of soda showed the greatest influence upon the light soils, as in the average of fifteen experiments the land which was fertilized at the rate of one hundred and sixty pounds of nitrate of soda per acre gave an average yield of 7⅔ tons per acre more than the land which was unfertilized.

Fertilizers with Oats. Seventy-four good reports of successfully conducted experiments in applying fertilizers to oats were received during the five years in which this experiment was conducted over Ontario. The lowest yield was obtained from the unfertilized land, viz., 38.9 bushels per acre; and the highest average yield from the complete fertilizer, 48.7 bushels; and the nitrate of soda, 46.3 bushels per acre. The unfertilized land produced the lowest yield per acre in each of the five years. The mixed, or complete fertilizer, gave the largest yield of oats per acre in the average results of this experiment for each of the five years in which it was conducted. Although the land which received the mixed fertilizer gave an average of 9.8 bushels of oats per acre more than the unfertilized land, still this increase was produced at a cost of about 47 cents per bushel. The mixed fertilizer gave a larger average yield than no fertilizer on heavy soils by 12.7 bushels per acre, on light soils by 10.2 bushels per acre, and on black mucky soils by 7.1 bushels per acre.

POTATO EXPERIMENTS, 1906.

Experiments.	Potatoes.	Comparative value.	Per cent. rotten.	Per cent. of small tubers.	Mealiness when cooked.	Bushels of whole crop per acre.
Late varieties (86 tests) . .	Empire State........	100	1	11	86	174.67
	Dempsey's Seedling. .	100	2	11	100	168.49
	American Wonder. . .	78	1	11	78	165.80
Medium varieties (70 tests	Rose of the North. .	100	2	12	100	164.36
	Burpee's Extra Early	82	2	12	97	150.23
	Seedling No. 230	68	2	11	72	147.62
Early varieties (144 tests)	Early Dawn	100	1	9	100	173.17
	Early Fortune.......	97	1	14	76	168.44
	Early Andes	97	3	14	79	143.63
	Early Pinkeye.......	69	....	15	52	133.88

Varieties of Potatoes. From year to year we find that there are many more applications for potatoes for experimental work than are received for any other class of material. This is owing, no doubt, to the fact that a potato test is comparatively easy to look after, and many persons are anxious to secure improved varieties. A very large number of applications were received in the spring of 1906, and three hundred first-class reports came to hand in the autumn after the crops had been harvested. From the foregoing table it will be seen that the varieties distributed were divided into three distinct classes; early, medium, and late. The same three late varieties were distributed in 1906 as in the previous year, but the results are slightly different. In the average of the co-operative tests for 1905, the Dempsey's Seedling produced about seventeen bushels per acre more than the Empire State, but by referring to the accompanying table it will be seen that the Empire State stands first in 1906 with 174.67 bushels; Dempsey's Seedling second with 168.49 bushels, and the American Wonder third with 165.80 bushels. While there is a difference in yield of about six bushels per acre between the Empire State and Dempsy's Seedling, it will be noticed that the experimenters have placed these two varieties equal in comparative value. In mealiness or table quality, the Empire State was placed first in 1905 and the Dempsey's Seedling first in 1906. Our experience at the College goes to show that there is but little difference between these two varieties in regard to table quality.

Among the three medium varieties sent out in 1906, the Rose of the North has given the best all round results, standing first in yield of potatoes as well as in table quality, and also being placed first in comparative value by the experimenters. To some readers of this report it may seem inconsistent to have the Burpee's Extra Early placed among the medium ripening varieties. As a matter of fact this name is somewhat misleading, as the variety does not mature along with the earlier kinds.

All four of the early varieties used in the co-operative work in the past year are of high value, and judging from general experience it would be rather difficult to make a decided choice among them. By referring to the table here presented, however, it will be seen that in the co-operative tests the Early Dawn is an easy winner, since it stands first in all respects excepting in freedom from rot, and even in this it is very good, since only one per cent. of the potatoes were found to be decayed. In general appearance, the Early Dawn and Early Fortune are very much alike, being about the same shape and color.

A MEMBER: How do you account for the fact that there are so many applications for potato seed?

MR. BUCHANAN: All the people eat potatoes, and most of the people grow potatoes. A potato experiment is easily conducted, while some of the other crops are much more difficult to handle.

MR. BROWN: During the last two or three years, I have had difficulty in getting potatoes marketed because the wholesale houses refused to buy them, stating that Ontario potatoes would not keep. Have you any information regarding the keeping qualities of potatoes?

MR. BUCHANAN: I cannot say that we have, any more than our general observations of the varieties which we have been growing, but most of them keep quite well if there are no rotten ones among them when they are stored.

MR. BROWN: At the present time a great many Quebec potatoes are being used in preference to those grown in Ontario.

A MEMBER: Is the Hairy vetch a perennial?

Mr. BUCHANAN: No, the vetches are both annuals, but the Hairy vetch is what we usually call a winter annual; that is, it is sown in the autumn and matures the following season. We have found, however, that at Guelph it becomes badly winter killed when sown in the fall, and we therefore sow it in the spring as a green fodder or green manuring crop.

A MEMBER: From Hamilton south, on the shore of Lake Ontario, they grow it for seed, but only a few men are growing it as a main crop, even there. It is used chiefly as a cover crop.

A MEMBER: Do you find any difference in the time of ripening of different strains of White Cap Yellow Dent corn? We have a strain that comes twelve days earlier than the White Cap Yellow Dent shown at the Fair.

Mr. BUCHANAN: At the present time we have five or six strains of this variety, and we are testing them side by side, and find quite a difference in the time of maturing of the different strains.

A MEMBER: Is the Daubeney oat weak in the straw?

A.—It is fine, but stands fairly well.

Q.—In growing mixed grains, could any other variety of barley besides the Chevalier be grown with the Siberian oats?

A.—Yes, you might use Two-rowed Canadian barley, as it will also mature at about the same time as the oats.

Q.—Why were peas not used in the mixture?

A.—Peas were used in several of the mixtures tested at the College, and they were found very useful when the crop was grown for fodder, but when a mixed grain crop was desired we found that we got larger yields from the mixture of barley and oats without any peas.

Prof. HUTT: We have tried several mixtures as cover crops for the orchard, but have not secured as good results as when the crops were sown singly, excepting in one case. One year we used a mixture of Horse beans, Prussian Blue peas and Crimson clover and they gave us the heaviest crop we have obtained, but following it up year after year we do not get as good results. In the case mentioned, the Horse beans held the peas up and then came the Crimson clover underneath, and we had what might be called a three-story crop.

Mr. RAYNOR: These experiments have certainly excited a great deal of interest throughout the country. Shortly after Prof. Zavitz introduced Mandscheuri barley, some people down east obtained the seed, and they supplied most of the farmers in that locality. As a result of this, the farmers down there look upon the O. A. C. boys as benefactors of that district. They say that the introduction of this variety has meant hundreds and thousands of dollars to them. I am satisfied that all the money used for this co-operative work is being profitably spent. One thought that came to me while Mr. Buchanan was speaking was, that we have not in this report any mention of the conditions surrounding individual experiments. Of course the experimenters themselves have this information at hand, but the summary report seems to be lacking in this respect. I know, of course, that we cannot have all of these things embodied in one report.

CO-OPERATIVE EXPERIMENTS IN FRUIT-GROWING.

BY PROF. H. L. HUTT, O. A. C., GUELPH.

I am pleased to report that great progress has been made during the past year in the co-operative testing of fruits. This work began in a small way thirteen years ago, with sixty experimenters testing strawberries, raspberries and currants. Every year since then it has steadily increased, more taking part in the experiments, and a greater variety of fruits being tested, till this year the work has more than doubled that of any previous year. The following table gives a good idea of the progress of the work, as it shows the nature and number of the experiments taken up since its inception in 1894:

Co-Operative Experiments with Fruits.

Nature of Experiment.	Number of Experimenters.													Total
	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	
Strawberries	15	20	20	50	100	100	100	116	143	119	166	222	244	1,415
Raspberries	15	20	20	20	25	25	25	35	48	44	46	69	93	485
Black Raspberries	15	20	20	20	25	25	25	35	52	43	53	46	67	446
Blackberries	....	....	20	20	25	25	25	35	32	47	42	42	32	345
Currants	15	20	20	20	25	25	25	38	48	29	39	48	31	383
Black Currants	....	....	....	....	....	....	....	....	....	43	47	50	53	193
Gooseberries	....	20	20	20	25	25	25	50	47	39	40	55	71	437
Grapes for Southern Ontario	....	....	....	....	....	....	....	....	....	....	....	....	82	82
Grapes for Northern Ontario	....	....	....	....	....	....	....	....	....	....	....	....	69	69
Apples for Southern Ontario	....	....	....	....	....	....	....	....	....	....	....	....	144	144
Apples for Northern Ontario	....	....	....	....	....	....	....	....	....	....	....	....	264	264
Total	60	100	120	150	225	225	225	309	370	364	433	532	1,150	4,263

From this table it will be seen that four new experiments with grapes and apples were added to the list this year. Material was distributed to 1,150 experimenters, and in all, material has been sent out for 4,263 experiments.

The total number of plants distributed has been 111,874, made up as follows: Strawberries 67,920, raspberries 11,640, black raspberries 10,704, blackberries 8,280, currants 4,008, black currants 1,544, gooseberries 4,424, grapes for Southern Ontario 492, for Northern Ontario 414, apples for Southern Ontario 864, apples for Northern Ontario 1,584.

Plan of Distribution.

Early in the year a circular, as given below, was sent out offering plants for testing, and the same was published in many of the leading agricultural and local papers. This gives particulars regarding the kinds of fruits, and the plan of distribution.

Dear Sir,—During the past ten years extensive variety tests with a great number of fruits have been carried on at the Ontario Agricultural College and at the twelve Ontario Fruit Experiment Stations in various parts of the Province. These tests have enabled us to determine what are the best varieties of each kind of fruit for the sections in which they have been tested. The object of this co-operative testing is to distribute more widely these leading varieties, that they may be further tested in every township of the Province, and that each grower may select for himself and grow more extensively those varieties which give the best results on his own particular farm. About 2,000 experimenters are already engaged in this work, and we desire the co-operation of all who are interested in fruit-growing.

The work is carried on through the agency of the Experimental Union, an organization managed by the officers, students, and ex-students of the Ontario Agricultural College, but every resident of Ontario interested in agriculture or horticulture is invited to join in the work and benefit by the results of the experiments.

The following list of experiments show the class of fruits and varieties of each offered for planting last spring. The varieties named make a good general collection for home use, and in most cases cover the season from early to late. They have been selected, after years of careful testing, as the ones most likely to give good results throughout the Province.

No. 1. Strawberries: Splendid, Clyde, Tennessee, and Irene. 12 plants of each.

No. 2. Raspberries:—Cuthbert, Golden Queen, Marlboro', and Columbian. 6 plants of each.

No. 3. Black Raspberries:—Gregg, Kansas, Palmer, and Older. 6 plants of each.

No. 4 Blackberries:—(Adapted only to *Southern sections of Ontario) Agawam, Eldorado, Kittatinny, and Snyder. 6 plants of each.

No. 5. Currants:—Fay, Red Cross, Victoria, and White Grape. 2 plants of each.

No. 6. Black Currants:—Champion, Lees, Naples, and Black Victoria. 2 plants of each.

No. 7. Gooseberries:—Downing, Pearl, Red Jacket, and Whitesmith. 2 plants of each.

No. 8. Grapes:—(For Southern Ontario) Concord, Wilder, Niagara, Lindley, Brighton, and Vergennes. 1 vine of each.

No. 9. Grapes:—(For *Northern Ontario) Champion, Worden, Winchell, Delaware, Lindley, and Moyer. 1 vine of each.

No. 10. Apples:—(For Southern Ontario) Primate, Gravenstein, McIntosh, Blenheim, Rhode Island Greening, and Northern Spy. 1 tree of each.

No. 11. Apples:—(For Northern Ontario) Transparent, Duchess, Wealthy, McIntosh, Scott's Winter, and Hyslop Crab. 1 tree of each.

Each person in Ontario who wishes to join in the work may choose any one of the experiments for 1906, and send in his application upon the accompanying form. If no form is at hand, all we require is that the applicant give the number of the desired experiment and agree to follow the directions furnished; to properly care for the plants, and to report the results at the end of each season as requested.

The material will be furnished in the order in which the applications are received, until the supply becomes exhausted.

A sheet giving cultural directions and instructions for the experiment chosen will be sent to each experimenter in due time, and plants will be sent by mail from the nursery in good time for spring planting.

All will be furnished free of charge, and the plants and produce become the property of the experimenter. In return we expect that each experimenter will follow the instruction given and will report each year, as requested, upon the growth and yield of each variety under test. Blank forms will be furnished annually for this purpose.

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* This division of the Province into North and South may be approximately made by a line running from Collingwood to Kingston.

The experiment selected should be indicated by using its number, as given in the list. It is well for each applicant to make a second choice in case the first cannot be granted. The supply of plants being limited, those who apply promptly will be most likely to get what is wanted.

Address all applications to H. L. HUTT, Ontario Agricultural College, Guelph, Ont.

APPLICATION FOR PLANTS.

The conditions on which the plants are sent out are, that the experimenter will endeavor to follow the directions furnished in caring for them and will report the results at the end of the season. And no plants are sent to anyone who will not agree to these conditions.

The following is the form of application sent with the circular offering plants for testing:

General Directions to Experimenters.

When sufficient applications had been received to make up our list of those to whom plants could be sent, a circular was sent acknowledging receipt of the application, that he might expect the plants, and giving general directions for conducting the experiment.

Accompanying the general directions a set of special directions was also sent for each kind of fruit. These are here given in connection with each of the experiments.

EXPERIMENT NO. 1.—STRAWBERRIES.

There has been a greater demand for this experiment than for any other on the list. Two hundred and forty-four experimenters chose this experiment this year and 222 last year. During the past thirteen years, 1,415 lots of plants have been sent out, or in all 67,920 plants.

One reason why this has been a popular experiment is because the strawberry can be more widely grown over the country than most other fruits. It is particularly adapted to northern sections of the Province, where many of the other fruits are not hardy. This is because the deep snows in these sections give the plants the best kind of winter protection.

The varieties sent out this year and last year were: Splendid, Clyde, Tennessee, and Irene. All of these are well worthy of a place in a collection for home use. So far 140 experimenters have reported on the crop, from the plants sent out last year. Clyde has been the most productive, while Tennessee ranks next. Both of these are midseason varieties. Splendid is one of the best early varieties, while Irene is a good late one.

One hundred and sixty-four of the experimenters who received plants this year have reported on the growth of the plants. There has, of course, been a number of failures, but, on the whole, the plants carried better this year than usual.

The strawberry plant loses vitality quickly when out of the ground, hence it is a difficult one to send long distance by mail. But it multiplies so rapidly that if the experimenter succeeds in getting a few of each variety to live, he can quickly propagate for himself all the plants he wants.

In order to get the experimenters to continue the work with plants of their own growing, a circular was sent out in the spring to all who received plants last year, advising them to set out a new plantation with plants from last year's plots. In many cases these little plots have thus become centres for the distribution of plants to others in the neighborhood, and in this way the value of the work is increased.

CULTURAL DIRECTIONS.

1. Prepare the land deeply and thoroughly, working in, if necessary, a liberal application of barnyard manure.

2. Set the plants in rows, at least 4 feet apart and about 18 inches apart in the row. If two or more varieties are planted in the same row, leave a space of at least 3 feet between them to avoid mixing of the runners.

3. The best method of planting is to use a spade, thrusting it deeply into the ground, then pressing it backwards and forwards. Into the opening thus made, spread out the roots fan-shaped, and pack the soil firmly about them with the foot.

4. Give clean, thorough cultivation throughout the first season and never allow the soil to become crusted.

5. Pinch off all blossoms the first season, that the plants may make vigorous growth and not waste their vigor trying to produce fruit.

6. Confine the runners of each variety to its own row, allowing them to form matted rows about a foot and a half wide. If any of the plants should die, place the runners of the adjoining plants so that they will fill up the spaces.

7. As soon as the ground is frozen in the fall, cover the whole plantation with an inch or two of strawy stable manure. When danger of frost is over in the spring, rake the coarsest of this covering off the plants and tread it down between the rows for a mulch. If it is not thick enough to keep down weeds and retain moisture, more may be added, at any time in the spring.

8. To continue the experiment from year to year, a similar plantation should be set out each spring, taking a dozen new plants of each variety from the plots set out the year before. The old plots may be plowed up after the second crop is off.

9. Carefully weigh and record the weight of each picking from each variety, and report the total crop from each as soon as possible after the fruiting season.

NOTE.—*Keep these directions, as they may be useful for future reference.*

EXPERIMENT NO. 2.—RASPBERRIES.

The varieties for this experiment were Marlboro, Cuthbert, Golden Queen, and Columbian. These varieties differ so much that although they are all included in the experiment, we do not ask for a comparison of yields with a view to discarding any of them, for all are desirable in a collection for home use.

Marlboro is one of the best early red raspberries, while Cuthbert is the leading red for main crop. Golden Queen is practically a yellow Cuthbert, a desirable variety for home use, but not one in demand for the general market. Columbian is one of the purple-cane group of raspberries and produces purple colored fruit. It is very productive, and by some of the experimenters is preferred to Cuthbert for home use, although the fruit is not so attractive in appearance.

CULTURAL DIRECTIONS.

1. Select a well drained site, and prepare the land deeply and thoroughly.

2. When transplanting cut back the dry or injured root ends to fresh, sound wood; avoid exposing the roots to the sun or drying winds; cover with moist, mellow, surface soil, and tramp firmly.

3. Set the bushes at least five feet apart, in one or more rows, as convenient. If planted all in one row, it is a good plan to arrange in the following order to avoid mixing the suckering kinds: 6 Cuthbert, 3 Columbian, 6 Golden Queen, 3 Columbian, and 6 Marlboro.

4. Pinch off any blossoms which may form the first year, that the plants may not waste their vigor trying to produce fruit.

5. Do not allow adjoining crops to encroach upon the bushes. To insure good growth, it is best to give clean, thorough cultivation from early spring till about midsummer, after which the bushes should mature their canes for winter.

6. The fertility of the soil about the bushes may be most economically maintained by occasional applications of barnyard manure. Unleached wood ashes, spread evenly on the ground, are particularly valuable for bushes, vines and trees.

7. The suckering varieties may be allowed to form a narrow hedge row, but do not let the varieties become mixed by letting the suckers grow up between the different kinds.

8. Prune every year, either in the late fall or early spring. Cut out all old canes that have fruited, and thin the weaker new canes, leaving about half a dozen of the strongest to each bush if kept in hills, or have them stand about 10 inches apart if grown in a hedgerow. Cut back the ends of the canes left to a uniform height of three or four feet, depending upon the vigor of growth. Where the canes are liable to winter killing, it is well to leave this shortening in till spring, when all frozen wood can be cut off.

9. In northern localities, where winter protection is necessary, bend down the canes late in the fall and cover the tops with earth to keep them under the snow.

10. Should any spaces have to be filled, or should the experimenter wish to increase his stock of any of the varieties, it may readily be done by taking up the young suckers which spring up around the bushes. The Columbian is propagated by bending down the tips of the new canes in August and covering them with a few inches of soil. They should make good strong plants by the following spring.

11. Carefully weigh and record the weight of each picking from each variety, and report the total crop from each, as soon as possible after the fruiting season.

Experiment No. 3.—Black Raspberries.

The varieties sent out for this experiment for several years were Gregg, Kansas, Palmer, and Souhegan, but for the past two years Older has been sent in place of Souhegan. Gregg is reported by most of the experimenters as the most productive, and Kansas and Palmer rank next in the order named. The canes of Gregg, however, are often winter killed in northern sections. The Older is one of the hardiest varieties we know of, and it has been included in the test in the hope that it may succeed where the other varieties prove too tender.

Cultural Directions.

1. Select a well drained site, and prepare the land deeply and thoroughly.

2. When transplanting cut back the dry or injured root ends to fresh, sound wood; avoid exposure to the sun or drying winds; cover the roots with moist, mellow, surface soil and tramp firmly.

3. Set the bushes at least five feet apart in one or more rows, as convenient.

4. Pinch off any blossoms which may form the first year, that the plants may not waste their vigor trying to produce fruit.

5. Do not allow adjoining crops to encroach upon the bushes. To ensure good growth, it is best to give clean, thorough cultivation from early spring till about midsummer, after which the bushes should mature their canes for winter.

6. The fertility of the soil about the bushes may be most economically maintained by occasional applications of barnyard manure. Unleached wood ashes, spread evenly over the ground, are particularly valuable for bushes, vines, and trees.

7. To make the bushes stout and branching, pinch off the ends of the new canes during the early summer when they reach a height of two or three feet.

In northern sections, where winter protection is necessary, it is best to let the canes grow long and slender, that they may be more easily laid down.

8. Prune every year, either in the late fall or early spring. Cut out all old canes that have fruited, and thin out the weaker, and any diseased canes, leaving about half a dozen of the best and strongest to each bush. Cut back the ends of the canes left to a uniform height of three or four feet, depending upon the vigor of the growth. Where the canes are liable to winter killing, it is well to leave this shortening in till spring, when all frozen wood can be cut off.

9. In northern localities, where winter protection is necessary, bend down the canes late in the fall and cover the tops with earth to keep them under the snow.

10. Should any spaces have to be filled, or should the experimenter wish to increase his stock of any of the varieties, it may readily be done by bending down the new canes in August and covering the tips with a few inches of soil. They should make good strong plants by the following spring.

11. Carefully weigh and record the weight of each picking of fruit from each variety, and report the total crop from each as soon as possible after the fruiting season.

Experiment No. 4.—Blackberries.

For several years this experiment has been chosen by experimenters all over the Province, and by many even in the more northern sections, but the reports have shown that, although the roots of the plants may come through the winter uninjured, the canes are usually frozen back, often to the snow line. For this reason we stated, in our circular offering plants last spring, that blackberries were adapted only to the southern sections of the Province.

The varieties distributed were: Agawam, Eldorado, Kittatinny, and Snyder. A few experimenters in the southern sections of the Province report that Kittatinny has been the most productive, but by far the greater majority report that Agawam is both the hardiest and heaviest yielder.

CULTURAL DIRECTIONS.

1. Select a well drained site, and prepare the land deeply and thoroughly.

2. When transplanting cut back the dry or injured root ends to fresh, sound wood; avoid exposure to the sun or drying winds; cover the roots with moist, mellow surface soil and tramp firmly.

3. Set the bushes at least five feet apart, in one or more rows, as convenient. As the suckers spread a long distance, the different varieties should be at least eight or ten feet apart to avoid their becoming mixed.

4. Do not allow adjoining crops to encroach upon the bushes. To insure good growth, it is best to give clean, thorough cultivation from early spring till about midsummer, after which the bushes should mature their canes for winter.

5. The fertility of the soil about the bushes may be most economically maintained by occasional applications of barnyard manure. Unleached wood ashes, spread evenly over the ground, are particularly valuable for bushes, vines, and trees.

6. To make the bushes stout and branching, pinch off the ends of the new canes during the early summer, when they reach a height of two or three feet.

In northern sections, where winter protection is necessary, it is best to let the canes grow long and slender, so that they may be more easily laid down.

7. Prune every year, either in the late fall or early spring. Cut out all old canes that have fruited, and thin out the weaker new ones, leaving a half dozen of the strongest to each bush, or allowing the new canes to fill in between those first planted, forming narrow hedgerows. Do not let the varieties become mixed by letting the suckers grow up between the different kinds. Cut back the ends of the canes left to a uniform height of three or four feet, depending upon the vigor of growth. Where the canes are liable to winter killing, it is well to leave this shortening in till spring, when all frozen wood can be cut off.

8. In northern sections, where winter protection is necessary, bend down the canes late in the fall and cover the tops with earth to keep them under the snow.

9. Should any spaces have to be filled, or should the experimenter wish to increase his stock of any of the varieties, it may readily be done by taking up the suckers, which spring up among the bushes.

10. When they come into bearing carefully weigh and record the weight of each picking from each variety, and report the total crop of each as soon as possible after the fruiting season.

EXPERIMENT NO. 5.—CURRANTS.

Currants are among the hardiest of the bush fruits. The plants also retain their vitality well in shipment, and transplanting, so that, as a rule, the experimenters have good success with their currant bushes. The varieties sent out for this experiment for a number of years were: Raby Castle, Fay, Victoria, and White Grape. With the majority of the experimenters the Raby Castle stands first for productiveness, but the fruit is so much smaller than that of the other varieties that either Fay or Victoria are preferred to it. This year Red Cross, a new variety which has given excellent results at the College for several years, was sent out instead of the Raby Castle. It remains to be seen if it will prove as successful over the country generally as it has been here. The White Grape currant is a favorite with many of the experimenters for home use.

CULTURAL DIRECTIONS.

1. Select a well drained site, and prepare the land deeply and thoroughly.

2. When transplanting cut back the dry or injured root ends to fresh, sound wood; avoid exposure to the sun or drying winds, cover the roots with moist, mellow surface soil and tramp firmly.

3. Set the bushes five feet apart, in one or more rows, as convenient.

4. Do not allow adjoining crops to encroach upon the bushes. To insure good growth, it is best to give clean, thorough cultivation from early spring till about midsummer.

5. The fertility of the soil about the bushes may be most economically maintained by occasional applications of barnyard manure. Unleached wood ashes, spread evenly over the ground, are particularly valuable for bushes, vines and trees.

6. Look for young currant worms on the lower leaves of the bushes as soon as the leaves are full grown. They may easily be killed by spraying with Paris green, 1 ounce to 10 gallons of water, or hellebore, 1 ounce to 3 gallons of water. To be most effective this should be sprayed on from under side of the bushes. A second brood of the worms sometimes appears about midsummer, when a second spraying may be necessary.

7. Prune every year, either in the late fall or early spring. A good plan is to grow them in the bush form with about six branches to the bush. Then adopt a renewal method of pruning by cutting out every year two of the oldest branches, and allowing two strong new ones to take their place. Cut out all the other new canes which come from the bottom, and shorten back the two left to about two feet, to cause them to branch out at a proper height.

8. Should the experimenter wish to increase his stock of any of the varieties, he may readily do so by layering a few of the lower new canes, or making cuttings about eight inches long, of the new wood pruned out, and planting them about six inches deep in moist mellow soil.

9. Carefully weigh and record the weight of crop from each variety, and report the results as soon as possible after the fruiting season.

EXPERIMENT NO. 6—BLACK CURRANTS.

The plants for this experiment were sent out first four years ago. Altogether 193 experimenters have received plants, and 120 have reported upon them this fall. Nearly all report that the plants have lived and done well. The varieties included in the test are: Champion, Lees, Naples, and Black Victoria. The reports of yields show that there is no very great difference in the productiveness of these varieties, for each is reported in one place or another as having done the best. On the whole, Lees and Black Victoria are the favorites.

CULTURAL DIRECTIONS.

1. Select a well drained site, and prepare the land deeply and thoroughly.

2. When transplanting, cut back the dry or injured root ends to fresh, sound wood; avoid exposure to the sun or drying winds; cover the roots with moist, mellow, surface soil and tramp firmly.

3. Set the bushes at least five feet apart in one or more rows, as convenient.

4. Do not allow adjoining crops to encroach upon the bushes. To ensure good growth, it is best to give clean, thorough cultivation from early spring till about midsummer.

5. The fertility of the soil about the bushes may be most economically maintained by occasional applications of barnyard manure. Unleached wood ashes, spread evenly over the ground, are particularly valuable for bushes, vines, and trees.

6. Prune every year, either in the late fall or early spring. A good plan is to grow them in the bush form, with about six branches to the bush. Then adopt a renewal method of pruning by cutting out every year two of the oldest branches, and allowing two strong new ones to take their place. Cut out all the other new canes which come from the bottom, and shorten back the two left to about two feet, to cause them to branch out at a proper height.

7. Should the experimenter wish to increase his stock of any of the varieties, he may readily do so by layering a few of the lower new canes, or making cuttings about 8 inches long of the new wood pruned out and planting them about six inches deep in moist, mellow soil.

8. Carefully weigh and record the weight of crop from each variety, and report the results as soon as possible after the fruiting season.

EXPERIMENT NO. 7.—GOOSEBERRIES.

Gooseberries are quite as hardy as currants, and may be grown anywhere in Ontario. The plants also stand shipping and transplanting well, consequently, the experimenters, as a rule, report that the plants have lived and done well. In some sections the plants suffered with the extreme drouth. The varieties included in this experiment are: Pearl, Downing, Red Jacket, and Whitesmith. Pearl has, on the whole, proved to be the heaviest yielder, but more good reports of Whitesmith have been received this year than usual. Wherever this variety can be grown free of mildew, it is one of the finest for either home use or market.

CULTURAL DIRECTIONS.

1. Select a well drained site, and prepare the land deeply and thoroughly.

2. When transplanting, cut back the dry or injured root ends to fresh, sound wood; avoid exposure to the sun or drying winds; cover the roots with moist, mellow, surface soil and tramp firmly.

3. Set the bushes five feet apart, in one or more rows, as convenient.

4. Do not allow adjoining crops to encroach upon the bushes. To insure good growth, it is best to give clean, thorough cultivation from early spring till about midsummer.

5. The fertility of the soil about the bushes may be most economically maintained by occasional applications of barnyard manure. Unleached wood ashes, spread evenly over the ground, are particularly valuable for bushes, vines, and trees.

6. Look for young currant worms on the lower leaves of the bushes as soon as the leaves are full grown. They may easily be killed by spraying with Paris green, 1 ounce to 10 gallons of water, or hellebore, 1 ounce to 3 gallons of water. To be most effective this should be sprayed on from the under side of the bushes. A second brood of the worms sometimes appears about midsummer, when a second spraying may be necessary.

7. Prune every year, either in the late fall or early spring. A good plan is to grow them in the bush form with about six branches to the bush. Then adopt a renewal method of pruning by cutting out every year two of the oldest branches, and allowing two strong new ones to take their place. Cut out all the other new canes which come from the bottom, and shorten back the two left to about two feet, to cause them to branch out at a proper height.

8. Should the experimenter wish to increase his stock of any of the varieties, he may readily do so by layering a few of the lower new canes, or making cuttings about eight inches long, of the new wood pruned out, and planting them about six inches deep in moist mellow soil.

9. Carefully weigh and record the weight of crop from each variety, and report the result as soon as possible after the fruiting season.

EXPERIMENTS NOS. 8 AND 9.—GRAPES.

Experiments with grapes were undertaken this year for the first time. Commercial grape growing in Ontario is confined to the southern sections of the Province, where the seasons are long enough to ripen the leading varieties, and where the vines require no protection in winter. Grapes may be grown in other parts of the Province, if the vines are given winter protection, and the earlier varieties are selected which will ripen in the shorter season. The varieties selected for the experiment for Southern Ontario were: Concord, Wilder, Niagara, Brighton, Lindley, and Vergennes. This list includes some of the leading varieties of each color. The early ripening kinds selected for the central and northern part of the Province were: Champion, Worden, Winchell, Delaware, Lindley, and Moyer. Eighty-two lots were distributed for Southern Ontario and sixty-nine for Northern Ontario. One hundred and twenty reports have been received this fall on the results of the planting, 43 report all plants living, 19 report a total failure, and the others report that one or more of the vines have died. Apparently the vines were not as fresh as they should have been when they were sent out from the nursery, and we intend to see that, if possible, better stock is sent out next year.

CULTURAL DIRECTIONS.

1. Select a high, well-drained site, protected, if possible, from the strong prevailing winds, and prepare the land deeply and thoroughly.

2. When transplanting, cut back all torn or injured roots, to fresh, sound wood; avoid exposure of the roots to the sun or drying winds; dig the holes large enough to admit the roots without cramping; cover with moist, mellow, surface soil, and tramp firmly.

3. For convenience of trellising it will be best to set the vines about ten feet apart in one continuous row.

4. For a couple of years the vines may be allowed to run along the ground, but as soon as they make canes four or five feet in length, they should be trained to a trellis. A good trellis can be made of No. 10 galvanized wire, nailed to cedar posts. The posts should be about 20 feet apart and four or five feet out of the ground. The number of wires necessary will depend upon the system of pruning and training adopted. For the "Fuller System," described below, four wires will be necessary, the lowest one about a foot from the ground, and the others equally spaced between that and the top of the post. The "Kniffen System" requires only two vines, one half way up, and the other at the top of the post.

5. The "Fuller System" is recommended for those sections of the country where the vines have to be laid down for winter protection. With this system the vines are cut back at the time of planting to one or two buds, and only the strongest one of these is allowed to grow. At the end of the first year this cane is cut back to within a foot of the ground. The second year two of the upper buds are allowed to grow, producing two branches which are trained each way along the lower wire of the trellis. At the end of the second year these branches are cut back to within four or five feet of the main vine and become the two permanent arms. From these arms new canes are produced about a foot apart, and are tied up as they grow to the upper wires. Every year these are cut back to within two or three buds of the permanent arms, leaving not more than about three dozen buds on the whole vine when it is pruned.

The "Kniffen System" of pruning, as described below, is recommended for those sections of the country where the vines may safely be left on the trellis all winter. At the time of planting the vines is cut back to a couple of buds, and at the end of the first year it is again cut back to one or two buds. The next year the stronger of these is allowed to grow, forming a long straight cane. At the end of the second year this cane is cut back to about five feet in length, or enough to reach the top of the trellis, which by this time should be ready for it. This upright cane becomes the permanent part of the vine. The next year four arms should be allowed to grow from it, one on each side at both the upper and lower wires. These at the end of the season should be cut off just beyond the sixth or seventh bud. This upright vine of old wood with its four arms of new wood makes the full grown vine as it is left each year after pruning. From each bud on the arms laterals are sent out in the spring upon which the fruit is borne. These may be allowed to hang free without tieing. The annual pruning now consists in renewing the four arms by cutting out the old ones as close as possible to the main upright, and training in their places the strongest laterals nearest to the main vine.

6. In the colder sections of the Province, where the vines are liable to winter killing, they should be pruned in the fall, and be laid down and covered with a few inches of earth before winter sets in.

7. Do not allow adjoining crops to encroach upon the vines. To insure good growth it is best to give clean, thorough cultivation from early spring till about midsummer, after which the vines should mature their wood for winter.

8. A cover crop of some kind, such as rye, clover, or hairy vetch, sown after the last cultivation in midsummer, is valuable for root protection in winter, and to enrich the soil when it is plowed under next spring.

9. The fertility of the soil about the vines may be most economically maintained by the judicious use of leguminous cover crops, and occasional applications of unleached wood ashes, spread evenly over the ground as far out as the roots extend.

EXPERIMENTS NOS. 10 AND 11.—APPLES.

Apples were sent out this year for the first time for co-operative testing. As with the grapes, two different lists of varieties were offered,—one suited to the southern and central sections of the Province and the other to the northern sections. Those selected for the southern sections were: Primate, Gravenstein, McIntosh, Blenheim, Rhode Island Greening, and Northern Spy. This makes an excellent selection of varieties for home use to cover the season from the earliest to the latest.

For northern sections the list included only the hardiest kinds, such as Transparent, Duchess, Wealthy, McIntosh, Scott's Winter, and Hyslop Crab.

The trees sent out were thrifty one-year old trees. These are preferable to older ones, as the experimenter may then form the head at whatever height he chooses. For northern sections we recommended heading them down to at least two feet, as the trees are then less liable to injury from sun scald. In all 408 lots were distributed, 144 for Southern Ontario and 264 for Northern Ontario. Three hundred experimenters have reported this fall on the growth of the trees, 136 report all the trees living, and only 13 report a total failure. The others report that one or more of the trees have died, but on the whole, the experimenters have had good success with their planting.

CULTURAL DIRECTIONS.

1. Select a high, well-drained site, protected, if possible, from the strong prevailing winds, and prepare the land deeply and thoroughly.
2. When transplanting, cut back all torn or injured roots to fresh, sound wood; avoid exposure of the roots to the sun or drying winds, dig the holes large enough to admit the roots without cramping; cover with moist, mellow surface soil and tramp firmly.
3. Set the trees far enough apart to allow for full development. This will depend largely upon the locality and soil. Observe the distance required for full grown apple trees in your neighborhood. In southern Ontario this will vary from 30 to 40 feet; in northern Ontario it will vary from 25 to 35 feet.
4. Form the head of the tree at whatever height you think best. In northern sections where trees are liable to sunscald, low heads with trunks not over two feet high are best. Prune the lower branches up to the desired height, and leave three or four main branches to form a well-balanced top.
5. Prune regularly every spring, thinning out as much of the new wood as may be necessary to prevent the top becoming too dense. Careful annual pruning avoids the necessity of cutting out large limbs when the trees get older.
6. Do not allow adjoining crops to encroach upon the trees. To insure good growth, it is best to give clean, thorough cultivation from early spring till about midsummer, after which the trees should mature their wood for winter.
7. A cover crop of some kind, such as rye, clover, or hairy vetch, sown after the last cultivation in midsummer, is valuable for root protection in winter, and to enrich the soil when it is plowed under next spring.
8. The fertility of the soil about the trees may be most economically maintained by the judicious use of leguminous cover crops, and occasional applications of unleached wood ashes, spread evenly over the ground as far out as the roots extend.
9. Guard against girdling of mice by banking earth against the trunks in the fall, wrapping the trunks with building paper, or tramping the snow firmly around the trunks from time to time after the first heavy snowfall.
10. Watch out for borers on the trunks near the ground every summer, and dig them out as soon as they are found to be at work.
11. Protect the trees against the ravages of insects on the foliage by spraying, or by removing the insects by hand until the trees get too large for such a method.
12. Experimenters wishing fuller information on any of these points, should send for our Bulletin on Apple Culture, which will be sent free on application.

In concluding this report, we may repeat what has often been stated before, that the real value of this co-operative work cannot be presented in any summary of the reports. Its greatest value naturally accrues to the individual experimenters who receive the plants and carefully conduct the experiments. Many are thus given a start in fruit growing who have never before given it any attention, and in making a start, they have a few of the very best varieties to begin with, and, for their guidance in caring for the plants, they have the carefully prepared directions sent out from the Horticultural Department of the College.

Mr. McNeill: I think Prof. Hutt has done splendid work in distributing material for these experiments. It is inducing farmers to grow fruit for their own use, as well as giving them a general interest in fruit culture. This co-operative work has been the means of educating many of the young men in the methods of fruit growing.

REPORT ON FARM FORESTRY IN ONTARIO FOR 1906.

By E. J. Zavitz, O. A. C., Guelph.

Farm forestry is mainly concerned with the care of the woodlot, replanting waste land, and the formation of protection belts or clumps.

There is a general tendency towards more rational treatment of the woodlot. The work with which we are directly interested is waste land and protective planting. What we need is a demonstration throughout the Province of the practicability of redeeming waste lands and making them productive. It is hoped that through the efforts of members of this Union, many sections of Ontario may be reached by co-operative planting. (See Agricultural College Report, 1906).

When forest tree planting is better understood, there will be many who will be anxious to follow the work. Many confuse forest tree planting with orchard and roadside planting. We are accustomed to such planting, and when it is imagined that to redeem waste land similar work and outlay must be expended the task seems too great.

In waste land planting the size of the plants used and the method of planting, make it possible to stock an acre with a very small outlay, as will be shown later.

In order to carry out co-operative work it has been necessary to develop nurseries in which to produce planting material. We have now two nurseries producing stock of native and foreign trees. The one nursery is devoted to growing evergreens, and the other which is on heavier soil is producing hardwoods.

In the evergreen nursery we have the following plants:

White Pine 1 year old seedlings	150,000
White Pine 3 year old transplants	45,000
White Pine 4 year old transplants	15,500
Norway Spruce 1 year old seedlings	50,000
Norway Spruce 5 year old transplants	10,000
Scotch Pine 2 year old transplants	17,500
Scotch Pine 3 year old transplants	15,000
Arbor Vitae 1 year old seedlings	25,000

At present we import the seedling White Pine, Scotch Pine and Norway Spruce, and place it in the nursery for one year when it is ready for final planting.

In the hardwood nursery we have the following plants:

Tulip or Whitewood 2 year old	11,500
Tulip or Whitewood 1 year old	2,000
Box Elder or Manitoba Maple 1 year old	12,000
Black Cherry 1 year old	2,000
Hardy Catalpa 1 year old	30,000

White Elm 1 year old	22,000
Soft Maple 1 year old	8,000
Black Locust 1 year old	18,500
Red Oak 1 year old	12,000
Butternut 1 year old	200
Black Walnut 1 year old	500
Hickory 1 year old	1,000
Chesnut 1 year old	100

There are also at these grounds 40,000 Norway Spruce, three year old transplants, which will be transferred to the Holmwood Nursery for another year.

The evergreens are best suited to waste land planting, but frequently, in the better portions of waste land, hardwoods may be used. For general waste land planting native white pine gives promise of being most useful.

In the spring of 1905 two plantations were made, and in the last season or spring of 1906 about twenty plantations were started. These have been made in the following counties; Stormont, Durham, Simcoe, Ontario, Halton, Wentworth, Wellington, Brant, Waterloo, Perth, Oxford, Norfolk, Lambton and Essex.

A brief outline of the formation of two of these plantations will be given. In the planting done in Durham County, which is an average type of sand-land planting in the spring of 1905, about two acres were planted out of an eleven acre field. In the spring of 1906 this work was continued. The field was originally cultivated and cropped, but to-day all the knolls and more exposed portions are of drifting sand. This soil produced splendid tree growth originally. Upon turning over a few inches of the surface sand there is to be found plenty of moisture which makes it even yet a good tree soil as the tree roots extend down into this moist portion. Portions of the planting area were covered with a sparse growth of grass and weeds. The planting material used was Norway Spruce and native White Pine. The owner had collected about a bushel and a half of Red Oak acorns which were also used on the better portions of the area. The evergreens were taken from the express office to the scene of planting and heeled in by a small stream in a protected place. In the portions of the field which were covered with grass and weeds a very light furrow was skimmed out every five feet. This furrow answered two purposes. It made a planting line to follow, and more important, it gave the planting spot a better moisture content. The plant, being placed on the side nearest the thrown out sod, it is protected the first year from being overtopped by grass or weeds. It was afterwards found that in many parts of the area the furrows gathered leaves and other drifting material which formed a mulch for the plants.

The actual planting was done as follows: Planting holes were made by driving in the spade and moving it back and forth. The plants were inserted and the roots firmly covered by a boy who carried plants in a twelve quart pail half filled with muddy water in which the roots of the plants were submerged. Plants used were from eight to twelve inches high with a very compact root system. From seventy-five to one hundred plants could be placed in the pail at once. Plants were spaced about five feet apart in the row and the rows five feet apart, which would mean that an acre required 1,742 plants. The Red Oak acorns were dibbled in with a sharp stick or dibble and spaced the same as the trees. The actual work required about three men per day per acre for the White Pine and Norway Spruce. The acorns were dibbled in at a much faster rate, a boy planting an acre per day.

Another type of land planted was on a steep hillside in Perth County. The soil was of a loamy nature but very stony and had a dense turf. This planting differed from the sand-land planting chiefly in the preparation of the planting holes. The hillside was to steep to put horses on so no furrows were run. The planting holes were made about five feet apart each way. In making these spots a piece of turf was cut out from the side of the hill with a grub hoe or adze and the soil loosened and freed from stones with a pick. The planting mattock would answer best in such soil as it is a combination of pick and grub hoe. After the soil was loosened the plant was put in with a strong spade as in the sand-land planting, although more care had to be exercised to cover the roots.

This planting took about twice as much labor as the previous one owing to the time spent in preparing the planting holes. Frequently in hillside planting it is possible to run furrows which can be used as planting lines. These furrows should always be run parallel along the hillside rather than up and down in which case washing down the furrow might occur.

The question of outlay in this work depends upon the nature of the site to be planted. Rough hillsides with heavy, stony soils naturally take the most labor.

In the Durham County planting of 1905 about ninety-five per cent. of the White Pine has grown. The Norway Spruce gave poorer results, only about seventy-five per cent. living. The White Pine has passed the most dangerous period and the land is well stocked with trees.

This last season's planting seems to have withstood the summer very well although it is early to make a definite report on these. We expect to hear from some of the members at this meeting regarding the plantations on their own land.

If the members of the Experimental Union and Farmers' Institutes find replanting practicable we shall soon have co-operative plantations in every part of older Ontario.

Mr. Percy Reid: My knowledge of forestry is quite limited, but I may be able to say something of value to the meeting, because what I know is of a practical nature. We have ten or twelve acres of waste land on the upper end of our farm. It is sandy loam of a fair quality. It is not profitable to till it, and for many years it has not been broken up. The only grass that grows on it is white Clover and it is of very little value for grazing. Even this year, when there has been no cattle on it, the amount of grass that has grown has been slight, and for several years I have thought of trying artificial forestry on this farm as I have read considerable about it. I decided, at my earliest opportunity, to try what I could do, and this spring I obtained 3,000 white pine from Mr. Zavitz. I was very much surprised at their size when I saw them. I had thought of them as good sized trees. They were only about six inches high. We received the trees on May 9th, and I kept accurate account of the work we had in connection with planting; so that I know exactly what the plantation has cost. Our only cash outlay was forty cents for expressage. We heeled the trees in the same evening we received them. It only required about an hour for myself and one man to do so. We went to the bush near the planting ground and heeled them in on the bank of a little spring creek. We made a little trench, and taking the trees out of the moss we spread them out in the trench, spreading the roots out and covering them up, and they were left there until we were ready to plant. Two of us went up on the afternoon of the 10th and made furrows about five feet apart. Then the next day the man continued with the plow, and in the evening the furrows were all ready, so that it took only a day and a half for the man and the team to do the work. The next day four of us took a one horse wagon and two pails and spades. We put the trees in the wagon and put some earth around them, and then put blankets over the trees to keep them from drying out. We worked in pairs, one man with a spade making the openings to put the trees in, and the other placing the trees in position and pressing the soil around them with his hands and then with his feet. We worked all day and we finished quite early the next evening, and that is all the time it took us to plant 3,000 trees, or an acre and a half of land. We measured the first two rows five feet apart, and after that we just guessed at it. I have been over the ground frequently during the summer, and I have watched the growth of the trees with great interest. Here and there you will see a dead tree, but very few. Some were washed out, and next spring when we re-plant we will do something to prevent them from washing out. They have made a very encouraging growth. Some of them have three or four inches growth on every twig. We intend planting more next summer because the ground is of very little value, and I think the trees will give us good returns. (Applause.)

Mr. Brown: I would like to ask Mr. Zavitz what steps are necessary to keep down the growth of grass?

Mr. Zavitz: If the soil is of a sandy loam type there is a very sparse growth of grass, and in that case you need to give no care whatever after the trees get a good start, especially where a furrow is thrown out. If the tree can get started the first season in fairly good shape, it will take care of itself. I think these white pine Mr. Reid planted will grow two or three feet next year. In heavier land, where there is a dense growth of weeds, it is advisable to go through in the summer and give them a slight inspection and cut back the weeds. I think you will have very little trouble on most waste land. We do not advise cultivation, but where you can cultivate for the first two seasons it is advisable to do so, because you will get better tree growth; but most of the farmers would not want to spend the time and, in real forest operations on a large scale, they never consider cultivation can be carried on economically.

Mr. Groh: We received our trees for planting about the third week in May. We found it did not take much labor to put them in. It took three men three days to plant this acre of land, it was very rough land. We were well pleased with the growth of the trees. Some of the trees were kept quite a long time before they were planted, and some of them became somewhat dried out, and we found those that we planted late made the poorest growth. After they were planted there was a period of drought of several weeks duration, but we did not find that that had affected them very much. The trees were planted on a hillside, on part of which lucerne was growing, and the trees which were planted in the lucerne grew just as well as the others. The first trees that were planted made very much the best growth; upwards of 75 per cent. of them grow.

The Chairman: I am sure we are pleased to hear these reports. It is certainly encouraging to those who are thinking of re-foresting. I would like to ask Mr. Zavitz if he has experimented with black walnut.

Mr. Zavitz: I do not think black walnut is a good waste land investment. It requires good soil to make good growth, and, even in the best lands, it would be years before you would get them of any value. Trees that are of commercial value are 200 and 300 years of age. If you plant them simply to get the nut it comes comparatively early. The trouble with black walnut planting is that the nuts are collected and allowed to dry too much in the fall, and another factor is that, if the nuts are planted in the fall in a very wet soil, they are liable to decay. Sometimes they may start germinating, and then the cold wet weather comes on and they will decay, and then squirrels and mice will find them and take them out, even if they are two or three inches in the ground. The best method is to collect the nuts in the fall and store them so that they will not lose their moisture. Keep them over until spring, and plant them with a dibble or planting stick. We have on this farm a black walnut plantation of about a quarter of an acre. It was planted years ago, and great things were predicted of it. It was going to make a great asset for the Government in years to come. It has done well considering the location. You have to plant black walnut not mixed with other trees if you want to grow them to perfection.

The Chairman: How long before it would make enough growth to cut?

Mr. Zavitz: A tree fifty years old usually has a large percentage of sap-wood which is of no more value than a great many other woods. It is the black heart-wood that is valuable. A tree fifty years old would measure probably 20 or 28 inches.

Mr. Sherrington: We have a man up in the county of Bruce who has several hundred black walnut trees. They were planted on a high hill, clay soil, in a row on the west side of his house. They were planted twenty-three years ago, and four years ago they measured from eight to ten inches in diameter. They will now measure from ten to twelve inches, and probably from forty to fifty feet high. They are planted in a double row about ten feet apart. They were cultivated for a few years and they are growing very rapidly. As to the amount of black heart-wood in them I could not say, but there seems to be no difficulty in getting the walnut to grow, and I think it can be grown successfully nearly anywhere in this Province.

Mr. Zavitz: For ornamental planting it would certainly pay to use the seedling. The fact that the black walnut grows here in Guelph is proof that it will grow almost any place in Ontario.

Prof. Hutt: I think it is a good tree to plant on a farm to produce nuts for the young folks. Certain trees have better nuts than others. I have seen walnut trees send out roots seventy feet away and they should not be planted near a hedge, or anywhere where they would affect the crops.

Mr. Brown: Can you give any data as to the cost to the average farmer of making a forest plantation?

Mr. Zavitz: That is a hard question to answer. For instance I have found in the last year's planting that I would strike one place where the man and his boys were good workers, and they could put the trees in twice as fast as other men. I think on poor waste sand lands an acre can be planted in a day by two men who know how to plant. We supply the trees free of cost, but the express is paid by the man who received them. The rest of the expense is in the actual planting, and the care afterwards is a very small factor. Sometimes you lose 20 per cent. of the trees.

Mr. Brown: Have you any estimate of the amount of land in the old part of Ontario that could be profitably made into forest land?

Mr. Zavitz: I have not, but I know that Norfolk county has a great deal of waste land along the lake. It is sand drifted soil. Durham county also has a large amount of drifting sandy soil, and many other counties have considerable areas of waste land which could be profitably used for forest purposes. I saw a fine farm in South Perth where they had a gravel ridge that could not be cultivated, and that is one of the places where I made a plantation.

A **Member**: Is there legislation that will allow the Province to take over land and make it into forest land?

Mr. **Zavitz**: The law will have to be changed before municipal planting can be carried out.

A **Member**: In our county we have the lake shore, probably a mile wide, and it is growing up with poplar and spruce, and so on. That land has been sold over and over for taxes, and the people who buy it keep it a year or two and then it is sold again and it seems to me that, if our township could take that land over in their possession and protect it, it would be a very short time before it would be a forest. This Experimental Union brought up the question of Municipal Forest Reserve. I think as soon as we can get a Forestry Bureau in Ontario this can be carried out successfully, but I do not think we can do so at the present time. In Europe there are many municipal governments which have no tax simply because they have forest possessions which give them all their revenue, and I think there are many counties in Ontario where they could almost get the revenue 100 years from now, and that is something the state should look foward to.

Mr. **Peter Grant**: Would not planting trees five feet apart be too thick?

Mr. **Zavitz**: Close planting is done to give the trees clean stems, free from branches. In Germany they plant the Norway Spruce as close as three feet apart. They will naturally thin out.

Mr. **Grant**: Four years ago I put in an acre of maples and other trees, and I put them eight feet apart and I find they are too close.

Mr. **Zavitz**: Do you want a grove or do you want timber?

Mr. **Grant**: I want timber.

Mr. **Zavitz**: I would let them crowd all they will. You want high growth, and if you plant them far apart you will not get high growth; you will get a spreading growth.

A **Member**: When I went on the farm where I live, there was possibly ten or twelve acres where the wood had been taken off. The man before me intended to clear it but did not do so, and I thought I would leave it. The under-growth is probably seven years old, and I find it is almost a natural forest; beech, maples, and bass-wood and elm, and I have trees there that are probably thirty feet high. The crowding system took place and the weaker ones went under and died. I have good straight trunks of twenty-five feet. The under limbs all rotted and dropped off. I had another piece of land of about ten acres that was waste land and it grew to a cedar swamp. It is now about twenty-two years old, and I can go to that swamp now and take out as many posts as would fence my farm. Of course they are not up to the standard of being large posts but, I think, in the space of three years the cedar swamp will have enough posts to fence my farm. The longer that cedar swamp is there the bigger the timber gets, and I think, if the larger trees were taken out, it would keep up indefinitely.

RESULTS OF CO-OPERATIVE EXPERIMENTS IN POULTRY RAISING.

By W. R. Graham, O. A. C., Guelph.

For a number of years we have been conducting co-operative experiments with incubators. The science of incubation, or, as some style it, the art of incubation is not fully understood. Incubation is influenced by so many things that it is often very difficult to locate the exact cause or causes of failure or success. At the Poultry department this season we have been making careful observations in natural and artificial incubation. We find that the hen does some things that an incubator does not do; for instance, the air surrounding the eggs contains more moisture than many incubators. We have found that one hen's eggs differ from another in the strength of the germs, the porosity of the shell, etc. Some hens lay eggs that will hatch under almost any conditions, while other hens lay eggs that require nearly ideal conditions. We find plenty of birds in the latter class; hence, in order to get large hatches of chickens that live, we shall find it advantageous to study nature. During the past year we have had a number of poultry raisers making incubator tests under our direction. Instructions were furnished to each experimenter, also a blank form on which to report results. Reports were received from ten experimenters in all. Most of them filled out the forms in detail, but we had a few who failed to let us know how many chicks were alive at two weeks of age. It is, of course, desirable that we should get as large a hatch as possible, and it is also desirable that the chicks be strong and healthy.

The majority of the experimenters operate their machines by the "dry method," that is to say, moisture is not applied artificially throughout the hatch. We had two experimenters who were operating the same make of machine, and both used moisture; one reports an excellent hatch, the other a hatch rather below the average. As is usual in such cases, one operator praises moisture, and the other condemns the use of moisture. From the information given on their respective cards I would judge one's success and the other's failure was largely due to the quality of the eggs.

Our experiments at the Poultry Department so far do not go to show that the use of moisture under ordinary conditions either helps or retards a successful hatch. What effect moisture may have upon the vitality of the chicks is another question, and one upon which we hope to get some information from our experimenters next season.

From the reports of the experimenters for this year we find that about 80 per cent. of the eggs set were fertile. The average hatch is 41 per cent. of the eggs set, or just about 50 per cent. of the fertile eggs. Of the chickens hatched about 70 per cent. lived past two weeks of age. Some experimenters raised a much higher percentage than others. For instance, one man who hatched 495 chickens, raised past two weeks of age, 89 per cent. One fell as low as 42 per cent. There are several causes, some of which are supposed to be due to feeding, others to bad breeding, etc. In one case the brooder lamp went out. We did not get sufficient information for us to arrive at any conclusion as to whether moisture, as applied during incubation, affected the vitality of the chicks or not. Next year we hope to have more detailed information along this line.

A Lady Member: They give us very explicit instructions about the air cell, that should be a certain size; are we to understand that there is nothing in this?

Mr. **Graham**: Those charts sent out with the incubators are absolutely useless; there is not an incubator manufacturer in the country who thoroughly understands the scientific part of the business. The incubator men are watching our experiments much more closely than anybody else.

Q.—What about the handling of eggs during incubation?

Mr. **Graham**: I do not think it makes any difference. These eggs were weighed every day, sometimes we carried them half a mile before we weighed them, and they were carried in all sorts of baskets and hats, etc.,—whatever was convenient at the time—and some days the eggs that were under the hen were marked to find out whether she turned them, and if there is any harm done to an egg by bumping them. These eggs certainly got the bumps.

REPORT OF THE COMMITTEE OF AGRICULTURAL CHEMISTS.

By Prof. R. Harcourt, O. A. C., Guelph.

Your committee have to report that fertilizer experiments were carried on with three classses of crops, namely, oats on swamp soils, market garden stuffs, and sugar beets.

Oats on Swamp Soils. Last year a report was made on the results of fertilizer experiments on swamp soils, and it was decided to continue the work. This year seven experiments were placed with the oat crop on swamp soils. Each experiment consisted of four two-square-rod plots. They were aranged as follows: 1 Potash, 2 Thomas phosphate, 3 Potash and Thomas phosphate, 4 no fertilizer.

Unfortunately, the excessive wet weather caused the loss of all of these experiments. Naturally the ground used in these experiments was rather low, and it was the first to suffer from the wet weather.

Market Garden Crops. Twenty-two experiments were placed, with onions, cauliflower, potatoes, and celery. Each experiment consisted of two plots, each of which was two square rods in size. One was treated with a mixture of nitrate of soda, superphosphate, and muriate of potash, and the other was left untreated. These experiments were principally with the market gardeners in the neighborhood of Toronto. On visiting the experimenters during the season, I found that the land on which these experiments were placed was originally swamp soil, and in some cases had been treated with as much as fifty to one hundred tons of farmyard manure per acre for twenty years or even longer. On these soils fertilizers gave no increased yields. On a few plots placed in the St. Catharines district some increased yields were obtained, but the reports are so few that no statement will be given at this time.

These experiments cannot be said to be a failure, in that the fertilizers gave no increased yields; but had I known more of the nature of the soil that was to be used in the experiments, I should have planned a different mixture of fertilizers. I have recommended the growers in the Toronto section to use lime to correct the acidity which is developing in these soils. I am inclined to think that the use of such large quantities of farmyard manure is not good, and that if at least half of it was replaced by mineral fertilizers, better results would be got from these soils.

Sugar Beets. Seven farmers signified their willingness last year to carry on co-operative experiments with fertilizers with the sugar beet crop. In order to make the experiment simple, and to get results directly from the factory, the experiment was made to consist of two plots, a fertilizer and a no fertilizer plot. Each plot consisted of one acre. The fertilizer plot received—

300 pounds of superphosphate, 100 pounds of potassium sulphate, 75 pounds of nitrate of soda.

The instructions were that this amount of fertilizer should be applied in addition to the regular treatment of the rest of the field.

Through the kindness of Dr. Shuttleworth, of the Ontario Sugar Company, Berlin, Ont., arangements were made that the beets from each plot were to be delivered separately at the factory, and the weights and the percentages of sugar were determined in the usual way at the factory. Six good reports were received, one experimenter failing to apply the fertilizers as directed. The results are embodied in the following table:

Experiment.	Yield per acre tared weight lbs.	Sugar, per cent.	Value.	Difference.
			$ c.	$ c.
I. Plot 1	15,576	13.8	35 78	
" 2	20,312	14.0	*47 32	11 54
II. " 1	23,738	14.5	57 24	
" 2	26,714	15.0	66 78	9 54
III. " 1	30,251	15.3	77 14	
" 2	31,777	14.8	78 23	1 09
IV. " 1	22,370	15.5	57 77	
" 2	24,746	14.8	60 92	3 15
V. " 1	25,838	15.4	†66 27	
" 2	29,403	15.0	73 50	7 23
VI. " 1	20,862	13.8	47 88	
" 2	21,500	14.4	51 49	3 61

* The total value of fertilizers was $7.80.
† No nitrate of soda was used. Total value of fertilizers, $5.55.

It will be seen that in three cases out of the six fertilizers gave sufficiently increased yields to pay for the cost of the fertilizers, with the first crop. It is quite probable that the potash and phosphoric acid will show results in yield in the crops following, so that results indicate that in these cases at least the fertilizers gave economic results.

This year the work has been continued with five experiments, but results have not yet been received.

The Chairman: Would you think it advisable to plant crops the succeeding year and keep a record?

Prof. Harcourt: I think that ought to be carried out. If we are going to get at the full value of the experiment we must know something about the second crop. We must know what there is left in the soil for future crops and what it is worth, and we can only do that by experimental work. After all, in connection with fertilizer work, each man has to experiment for himself.

Mr. Reeves: I do not think the experiments were a failure this year. It is not the intention to drop these tests. One result of Prof. Harcourt's visit to us is that we think we found out one thing our land requires that we did not know before.

Prof. HARCOURT: These were largely swamp lands lying between sand hills which had been cleared up and then manured with from 100 to 150 tons of farmyard manure per acre for 20 years, so that it seemed rather a waste to use chemical fertilizers on some of them.

The CHAIRMAN: Did you take into consideration early maturity?

Prof. HARCOURT: Yes, that was one point we wanted to bring out, not only the effect of the fertilizer on the yield, but also on the quality of the crop and on the earliness of maturity. One thing the sugar beet growers liked about the experiment was that they were able to thin out three days earlier, and they were therefore that much ahead of any weed life that was there, and that made a difference in the crop.

Mr. REEVES: Would an ordinary vegetable crop forced by commercial fertilizers have as good keeping qualities as a crop not forced in that way?

Prof. HARCOURT: I think where a crop is forced with nitrogen it reaches maturity earlier, and it is doubtful if it will keep as well as if it had been grown without nitrogen.

THE INTRODUCTION OF VEGETABLE TESTS IN CONNECTION WITH OUR CO-OPERATIVE WORK.

BY PROF. H. L. HUTT, O. A. C., GUELPH.

The subject announced is one that I have been thinking of for some time, but as we were not yet prepared to undertake co-operative tests with vegetables, I have said nothing about it. There seems to be a desire on the part of some of the vegetable growers, however, to have such taken up by the Experimental Union, and for that reason I have been asked to introduce the subject for discussion.

My own opinion is that it would be an excellent thing, but before it can be properly undertaken there are a few things which should be considered.

In the first place, it would be best to have at least two or three years' careful work along this line at the College, upon which to base our selection of varieties for distribution and further tests throughout the Province. This is the first year we have ben able to make extensive tests of vegetables at the College, and although we could select a number of varieties of the various classes of vegetables which stand out prominently as good ones, still it is not well to put too much reliance in a single year's test. We would like to have as firm a foundation upon which to base our co-operative work with vegetables as we have had in our experiments with fruits and farm crops.

Another matter which must be considered is the item of expense. Before such work can be extensively engaged in, we will require a considerable increase in our grant. Probably this can be managed. I think it will be best, however, to begin on a small scale and gradually extend the work, as has been done in all the other branches of this co-operative work. It would hardly be safe at first to make a general announcement that we intend to distribute vegetable seeds for testing, for no doubt as soon as such became generally known we would be swamped with applications for seed.

I mention these as a few of the things which should be considered, and would be glad to hear what others may have to say on the subject.

The CHAIRMAN: I think this is a very important matter. There is a great field for work along this line and we would be pleased to have the subject freely discussed.

Mr. W. J. BROWN: I understand that Prof. Hutt desires to postpone co-operative work with vegetables for a year or two. It seems to me it might be possible to start this work sooner if the Vegetable Growers would appoint a committee to advise with the Director of this work and throw the responsibility upon the Vegetable Growers' Association and let them select a certain experiment that might be undertaken this year. I know from discussions carried on at the Vegetable Growers' meeting that there seems to be a feeling on their part that something ought to be done at once.

The CHAIRMAN: I am a member of the Vegetable Growers' Association, and I know there is a feeling that they want to get started at something, but have not yet any definite idea of what should be done. With Prof. Hutt, I am of opinion that we should make a good start, and that the work should be mapped out clearly and then undertaken in earnest.

Mr. THOMPSON: I think if there is money for the purpose, that it would be wise that some tests of known varieties might be inaugurated this year in order to start the ball rolling.

Prof. HUTT: We have been conducting some co-operative vegetable tests this year, but not in connection with the Experimental Union. We selected a dozen varieties of tomatoes for this work. We wrote to the tomato canners, and got them to give us the names of the leading tomato growers in their respective districts, and these men were asked to co-operate with us in making tests of tomatoes. Our object was to find out the best varieties from both the growers' and canners' standpoints. We asked the canners to report on the quality of the different varieties from the canners' standpoint and the growers from the growers' standpoint, and we have a number of reports from various districts all the way from Picton to Amherstburg. Besides the results of the work here referred to, we have our own experience with tomato tests here for the past ten years, and I think with such a basis to select from we could safely undertake tomato tests in connection with the Experimental Union work at once, and if thought desirable, we might also add one or two of those crops, such as beets, carrots, and lettuce, with which we had extensive tests here this year. I do not wish you to get the impression that I am anxious to postpone this work any longer than is necessary, but I want to be sure that when we make a start, we make no mistakes.

Mr. HOLTERMANN: Could not the work that was done during the past year be transferred to the Experimental Union? It seems to me that as far as possible we would like to meet the views of the Vegetable Growers' Association.

Mr. SHERRINGTON: I think this matter should be left to a special committee to be appointed right here at the present session. This work requires very careful thought, and a plan should be worked out whereby it could be carried on. We have a Horticultural committee here and also some of the members of the Vegetable Growers' Association, and there ought to be a committee appointed to map out the work on a small scale.

Mr. REEVES: So far as the members of the Vegetable Growers' Association are concerned we would like to have experiments conducted, but we want to know how they are to be conducted and by whom. So far as the Experimental Union is concerned, I have only been able to gather slight information with regard to it, and we came up here merely to see in what way the experiments are conducted. Of course we have to report to our Association at their annual meeting in January. We are merely a committee to see what opinions we can gain along this line.

Mr. DELWORTH: We are here to-day as representatives of the Vegetable Growers' Association in response to an invitation received from your President. We will be most happy to listen to any suggestions you may make regarding vegetable experiments, but we have no authority from our Association to ask the Experimental Union to conduct vegetable growing tests either by yourselves or in co-operation with us. We will be most happy to hear what you have to suggest to us, and we will report to our own Association—

After some further discussion, Prof. Hutt, Mr. McMeans, Mr. Robertson, Mr. Holtermann, and Mr. Buchanan were appointed a committee to confer with the representatives of the Vegetable Growers' Association. At this meeting, plans for conducting co-operative tests with vegetables were discussed. The representatives of the Vegetable Growers' Association expressed a desire that this work be undertaken by the Union, and the committee for the Union explained that it was intended that such work be taken up as soon as the experimental work conducted at the College would furnish sufficient basis for selection of varieties for experiments. It was explained that from the work already done last year, experiments might be taken up this coming year with such crops as beets, carrots, lettuce, and tomatoes, and if the interest shown in the work warranted it, other crops would be added to the list in due time. This seemed to meet with the approval of all present, and the Vegetable Growers' representatives promised their hearty co-operation.

OUR COMMERCIAL FRUIT INTERESTS.

BY A. MCNEILL, CHIEF OF THE FRUIT DIVISION, OTTAWA.

It would be very easy to say some pleasant things about some of the people I see here to-day, and how they have helped to develop the fruit industry, but I will leave them, and say a few words on how I think the industry can still be developed. For that purpose I think we might very well divide the fruit business into two great sections: the first, what we call the "tender" fruit industry, and the other the "hardy" fruit industry. It divides not only the industry itself, but very fairly divides the geography, so that, in dealing with one particular class of fruit, we can also deal with particular sections of country. The tender fruit industry here in Ontario is confined largely to the eastern counties along the north of Lake Erie, including the counties on the west end of Lake Ontario. There you have a region in which can be grown to perfection the peach, the plum and the cherry, and small fruits and all kinds of vegetables suitable for canning purposes, so that the great canning industry and the tender fruit industry are confined largely to this section. I said this section was one of the most favored sections in Canada; I might say in the world. I know of no place, as far as climate and natural suitability of situation are concerned, that has greater advantages; and I predict that if you will but develop the advantages this district has, there is no part of North America that can be more prosperous, or that is situated so as to develop a finer race of men and women than the southern counties of Ontario. I do not think this section will do itself justice unless it develops very largely an early fruit and vegetable industry. We do not need to be politicians, or to have a very wide grasp of economic questions, to recognize the fact that for many long years to come this country is going to be to a certain extent protective, and that this protection is going to aid a little in the development of this early fruit business. This southern tier of counties is over two weeks ahead of the rest of the Province in the market with fruit; it has two weeks advantage in point of time. The county of Essex and the Niagara District harvested strawberries somewhere from the 6th to the 10th of June, and that is certainly two weeks ahead of the local berries about Ottawa, we will say. During these two weeks Ottawa will take from one to two carloads of strawberries every day, and so on with the rest of the fruit and vegetables. I need not waste time in stating to you that this southern tier of counties would grow enough fruit, if properly managed, to supply the needs of Canada for many a long day to come, and when farmers in the district referred to, give up the coarser and less productive fruits and adapt themselves to the growing of the finer and the more profitable crops, such as early vegetables and early fruits, there will be an entire change, I think, in the population, and in the general comfort and style of living, that goes along with the greater profit and greater skill that is necessary in this particular trade.

Now the question comes, have we the markets that will take this stuff when it is grown? I can simply say that there is no market that I know of that has a ready supply except the distinctly local markets. The local markets in the immediate neighborhood of this southern tier of counties are, I think, supplied and sometimes over supplied; but the distant markets—and by those I mean markets seventy-five, one hundred, and two hundred miles away from where the products are grown—are not supplied at the present time. One of the constant complaints that I hear from merchants in Ottawa and Montreal is that they cannot get the material they require. In this matter of small fruits they are looking, and anxiously looking, for the proper development of this trade, and it has not come yet. They say: "Why are your fruit growers so slow; why don't you open up this trade?" There is a splendid opportunity in the small fruit business. The trade is simply in its infancy. There is not a single market that I know of that is anything like supplied.

Then, to come to the markets of the great North-west; the small fruits can never be produced early enough in the North-west to compete seriously with southern Ontario, notwithstanding the handicap of the freight rates. I therefore regard the markets of the west as certainly within reach of the growers of Ontario, although possibly we are not within reach of the demand at the present time. I am not hopeful that we are going to have an immediate development of the tender fruit industry. It will not do to spread this trade over a large area, a little here and a little there; it will never work. We want to have the fruit grown in large quantities at particular points, because we will have to ship the fruit in car-load lots. We ought to have car-loads of strawberies. At the present time there are markets that will take car-loads of strawberries if we can furnish one solid car-load of one kind of package and one kind of berry. It would require something like 800 crates to fill a car with strawberries, and there are not enough growers in any one locality to furnish 800 crates per day at a single shipping point.

Another very necessary requirement is continuous supply. It will not do to limit yourself to a particular need. You must have a continuous supply of stuff in order to hold your customers, and in order to secure proper transportation; for that reason I would strongly recommend that fruit growers move along with their industry. Take early vegetables; there is no place that can do this better than the same tier of counties. Wellington has developed this early vegetable trade. The early vegetable come in first, and they form a splendid introduction to the fruit that comes on a little later in June, July, August and September; and those that have control of these matters ought to endeavor to get their neighbors to grow the same early stuff in order that they may have a continuous supply of material to hold their customers, and to secure proper transportation.

If this region lives up to the advantages it possesses, it must have men in the neighborhood who will look upon this question in a proper way, and the whole neighborhood should unite for the purpose of developing along these lines systematically. I am sorry to say this is one of the most difficult parts of the whole problem; this question of getting fruit men to work one with the other. There is such a spirit of jealousy. There has been a wrong ideal developed among the people on this continent; perhaps less in Canada than in the republic to the south of us. Instead of developing a society, every man says, "I am independent. I am in the world for myself. I stand alone. I am self-sufficient." That is all wrong. We must get away from that idea of society. We must recognize that the basis upon which to build any civilization that is worthy of a country like this is social not individual; and such a change of ideal lies right at the basis of this problem of co-operation among fruit men. Along with this development of the early vegetables and fruit trade will come the development of the canning industry.

Now, I want to say a word or two with regard to the hardy fruits. I have spoken so far simply of the southern tier of counties along Lake Erie and the north-west end of Lake Ontario, and a little strip along the northern shore of Lake Ontario, Prince Edward County, for instance. I want now to say a word with reference to the hardy fruit belt of Ontario, for, after all, the great fruit industry of Ontario has to do with hardy fruits; such as the apple, that king of fruits; and I want to say just a word or two directing your attention to the advantages and the possibilities of the trade in this fruit. There is a section of country just north of that tier of counties we have been speaking of, including the counties on Lake Huron and the middle counties of Lambton, Middlesex and Brant, but not including that heighth of land in the county of Dufferin and Perth and the southern portion of the county of Grey. That high land is not particularly suitable for winter apples. The climate is just a little severe and every portion of it is not perfectly safe for orchards. Unfortunately, our winter apples are tender, and it is only the early apples that are hardy; in that region bordering on Lake Huron, extending back as far as Walkerton or a little further, and perhaps including Guelph, I rather think the climate is a little severe to be within the genuine winter orchard belt. But, leaving out this high land, we have yet an enormous belt of land extending from Lake Huron right through to the county of Frontenac, along the north shore of Lake Ontario that can grow winter apples to greater perfection, all qualities considered, than any part of the earth's surface. That is a high claim but it is true. The State of New York has been celebrated for its apples, and justly so. As far as the color, size and flavor is concerned, no man can find much fault with the apples grown in New York State; but when it comes to the keeping qualities of the apples grown in New York State and the southern counties of our own Province, they will fail in this essential quality that they will not keep. That is just the truth of the matter. I know I have been accused of slandering the southern tier of counties, but we should not mince matters. Apple buyers avoid that section when they are buying their stock. Even this year these people to the south have, some of them, sold their apples at 50 cents a barrel, while people growing the same variety of apples in this winter belt have been getting $1.25 and $1.50 a barrel for the bare apples without packing. They get twice and sometimes three times as much for their apples in this winter belt as they do in the south. If the apple buyer attempted to store Spys, Baldwins, and similar varieties grown in southern Ontario or New York State in the ordinary storage, they would suffer a shrinkage of 10 to 25 per cent. The apples grown on Georgian Bay can be put in ordinary storage, and can be held until the price is higher, with a shrinkage of only from 5 to 6 per cent., or, at most, 8 per cent., and in some places they have a shrinkage of only 2 per cent. I think there will be 25 per cent. of shrinkage in apples grown on the southern belt, and that simply means that the people in this winter belt in this region north of Lake Ontario extending through to Lake Huron have the advantage of the price of cold storage, which is just about 40 cts. per barrel. You can easily see why the orchards are flourishing, and why the apple growers in this belt have made such large profits. They have this advantage of 40 cts. per barrel, and the business fits in admirably with mixed farming. It would not be at all impossible to double the value of the farms in these counties by planting orchards. Do not worry about markets; they are going to extend very much faster than we can possibly supply them. Everything points that way. We have every advantage, and I know of no man who looks into the future, but who will agree with this statement that the markets are going to open much faster than we can fill them. There is no danger of there being a surplus in this section. You can simply put the apple growers of the southern district out of business; they do not compete with you because the apples they grow are used up before yours come into the market.

I am very much in favor of a system of mixed farming. I believe here and elsewhere we will find the highest type of men and women are developed by mixed farming. I am not talking only in the interests of the fruit industry; I am keeping in view the general development of the Province, and I believe you can develop men and women better by a system of mixed farming than you can in any other line of farming. Put ten acres of orchard on every farm in this winter belt. You can get land for $50 an acre, and for another $50 you can put an orchard on it. When the trees have reached the age of ten years the orchard will become, not only self-sustaining, but an interest bearing proposition. I know what I am speaking of, because I have been planting trees for a number of years. I am the owner of about three thousand trees now, and I am proud to say no hand has touched any one of these three thousand trees but my own, and some of them are five years old. I feel a pleasure in it, I know what it costs, and I can say confidently that I can grow an orchard up to the age of ten years, and, counting the revenue that comes from the soil and giving full credit for that, it will not cost more than $50 an acre to grow the orchard. When I have it there, what have I got? I say $500 an acre is a moderate price for an orchard in full bearing, and many men value their orchards at $1,000 per acre. With an expenditure of $100 for land and trees, and waiting for ten years, you have an increase of from $500 to $1,000 per acre. That means another family upon every farm, doubling the population, and better facilities for living. I maintain that the ideal condition of society is not manufacturing. Humanity must go down, and it is going down, when it is exclusively confined to manufacturing towns. Manufactories could never exist were it not for the draft they make upon the agricultural sections. Manufacturing towns are simply great whirlpools that swallow up the population that come into them from the country. The raising of live stock, or any special kind of farming, is not the best thing for the country. I advocate the development of the natural advantages we have in this belt of Ontario. I think it will increase the population and be the best thing for the country as a whole. I know of no branch of farming that affords better opportunities for young men than fruit growing under proper supervision and under proper circumstances. Do not attempt to do the early fruit business away in the north, and do not attempt to grow winter apples in the south, but use your brains and develop each portion of country according to its natural advantages. I know of nothing that affords better facilities from a financial standpoint.

I sincerely trust that in the near future we will have the revival of this industry, which we sorely need.

Mr. Robt. Thompson: I heartily agree with what Mr. McNeill has said. In past years, in my own county, some of the farmers have said, "Do not talk too much about fruit growing, because we will have too many fruit growers and prices will go down." There are many portions of this Province where some kinds of fruit can never be grown commercially, and no matter how much fruit is grown in these older sections it will only create an appetite for fruit elsewhere. I think fruit is one of the most healthful foods we have, and I do not think it is used enough. From New Year to New Year we should have fruit on our table available all the time. Our home market is gradually increasing, and I doubt if we can keep pace with the demand in the North-west. We have heard it said that British Columbia is going to come in and capture that market. We hope they will be able to produce large quantities of fruit, but, no matter how fast they increase, they will not be able to supply the demand, and they will not be able to compete with us in certain lines. When I read in the papers about young men leaving Ontario—sometimes the best of our citizens going out into that section—I often think that a great many of them would be better at home. They might not make quite as much money at home but they would have a better life. We, in Ontario, are keeping the bright side turned down. I know this is the case in a good many instances. Farmers do not want to say how much money they are making on their farms. Possibly ninety-nine one-hundredths of the fruit growers do not want to say how much they make out of the fruit crops in the year because they are afraid of competition. People in the city think fruit is grown for nothing, and they think there is no harm in coming out of the city with their baskets and going into an orchard and taking fruit. Where fruit is grown you will find they have the most advantages, and fewer of the young men leave their homes and go to other parts of the country. I think that if more attention was given to our fruit industry, it would help to solve the problem of keeping young men on the farm. In the county of Lincoln, and the adjoining county, we have very little trouble with our young men leaving the farm. I have thought seriously over this, because I have only one boy, and I have often said, "If that boy would leave the farm my interest in life would be largely gone." And, thinking of him, I naturally think of my neighbor's boy, and I can say honestly that very few of them are leaving the farms; and more than that, we find that the farmers and their sons are leaving the less favored sections and coming into our county. The majority of farmers of this Province do not realize how much fruit they can grow on a farm. Professor James points out the fact that, according to statistics, there are 7,000,000 apple trees in this Province. The estimated crop on these trees in the year 1904 was some 50,000,000 bushels, and, out of that great crop, only a comparatively small amount is sent out of the country. I believe over one-half of our apple crop is wasted. In the autumn of 1904 the fruit growers in our locality sent two car-loads of apples to the North-west in charge of Prof. Reynolds, with the understanding that we should receive exactly what the apples sold for. The Professor came back and reported, and I believe nothing has done so much good to the fruit growers ot St. Catharines as that one small transaction. As a result, the next year these fruit growers made up their minds that they were going to send out regular shipments, and some eighteen or twenty cars were sent out the next year. Some got good prices and others did not, but we learned the cause of the failures, and this year we followed it up with sixty-four cars, and it has been a grand success. I believe the North-west will take every pound of fruit that is grown in the Province of Ontario, provided it is put up in a proper way. The price of fruit was never better in our section than it has been this year. We started in on the 7th of August, and from that to the end of the year, we have been sending the fruit along, and I know that farmers have put in from fifty to one hundred baskets of apples, and they have averaged from 50c. to 90c. a basket. Of course those who put their apples in boxes receive more money. We could not supply the demand, and we had to refuse orders for boxes and barrels of apples.

I am sorry to say that there are a lot of apples sent out from this Province to the North-west that should not go there unless they are properly marked. I think that a lot of men, who are exporting apples, are sending their culls to the North-west and the best apples to the Old Country. What you students want to do is to realize that there is more money in apple orchards and small fruits than you think. The majority of orchards in the country are not pruned and sprayed as they should be.

There is an unlimited market in the West for red and black currants. This season we had to refuse orders for 200 baskets of red and 200 baskets of white to be shipped twice a week to a town in the West, and that town is right at the door of British Columbia. It will be twenty years before there is any danger of competition from British Columbia, and the competition will never be serious with certain Ontario fruits. In every town from Calgary to Winnipeg, when I asked the dealers about our Ontario apples, they said they preferred the Ontario apples if they could depend on the packers. They liked them better than British Columbia apples, because they had a better flavor and better keeping qualities. When I was in British Columbia I got a liking for their fruit, but when I got back to Ontario and saw our apples, I said I would have given $10 if I could have had a basket of them with me when going through British Columbia. We can show better fruit and more of it than they can in any other Province of the Dominion.

The Chairman: It is not what we grow that we make our money out of, but what we grow and market successfully. The reason why so many apples are wasted is because they have no system of shipping, but now that we have co-operative shipping societies, we are able to ship our apples to better advantage. Mr. Sherrington is at the head of one of those co-operative institutions, and I would ask him to take part in the discussion.

Mr. Sherrington: This is rather a wide subject. The fruit situation has been somewhat neglected for a great many years, especially the market side of it and the care of the orchard. Our orchards have not been properly cared for, and we have too many varieties of apples in this country. What we want is a large, well-colored apple, and of the best quality that can be got. I handled this year about twenty-five cars, and in some cases our old standards have been the Spy and the Baldwin. Sometimes, however, Russets have constituted two-thirds of my shipment. In making up car-loads we can never realize the same price when we send a number of varieties as we do when we send a car-load of one variety. What we recommend to anyone who is planting an orchard is to plant only one or two varieties. Spys, Kings and Baldwins always sell for good prices. I had twenty-four varieties in one car, and what can you do with cars of apples of that description? You can only get one-half the price you could get for a car of Spys or Baldwins. By means of the co-operative movement we have overcome that state of affairs to a great extent, and we can now find a market for these different varieties at a fair price, but we have to have a sufficient quantity to select from. I would strongly advise growers to be careful in planting for future use, and I would advise top grafting these undesirable varieties.

A MEMBER: Is the Ben Davis an undesirable apple?

MR. SHERRINGTON: I have always upheld the Ben Davis. It is an apple that sells fairly well, and is a good keeping apple and it makes you money; but I would not advise you to eat it excepting in the proper season. It is not good for the local market, but it looks nice, and if you ship a barrel of Ben Davis to Europe and a barrel of Spys, the Spys will not reach the European market in as good a condition as the Ben Davis.

Another point is as to the methods of handling the apples and other fruit in this country. The desire of the dealers is to make money out of the fruit, and they do not seem to have any interest in the consumer. Therefore, I think the growers themselves should take hold of this trade, and see that the fruit is put up in proper packages and in an attractive manner, and with greater uniformity. There is no way it can be done better than under the co-operative system. I am glad to say that I think, that in the course of a very few years the whole of our fruit industry will be handled under the co-operative associations. It has given entire satisfaction wherever tried. The local fruit growers' association asked me if I could find a market for their fruit this year, and I said "Yes." They are all farmers, not exclusively engaged in fruit growing, and I have sold for them this year 2,000 barrels of apples; and all we sent were in first-class condition. We have made up our minds to build up a reputation from the start, and we put in nothing but first-class apples and put them in first-class barrels.

READING IN THE FARM HOME.

BY PROF. J. B. REYNOLDS, O.A.C., GUELPH.

The farmer's interests, if he is up-to-date and intelligent, are manifold. First he has his business interests, then his public interests, and his social interests.

Now, in informing himself with respect to his business, there are various means besides that of reading, but in reading we should perhaps place the agricultural paper first in importance. The agricultural paper, while not so scientific nor so accurate as the text book or the bulletin, nevertheless it is up-to-date and practical. It deals with the immediate interests and needs of the average farmer. Its columns are filled with contributions from men of experience, and the editorial pages are written presumably by men of wisdom and of wide outlook. A first-rate agricultural paper ought to be indispensable in the farmer's business. Books, by being placed second, are not by any means considered of little importance, but a book, no matter how good it may be, is likely in a short time to be out of date. Nevertheless, certain standard works on agriculture should be in every farmer's library, and the best use to make of these books is as reference works. Presumably a text book on agriculture is scientific and accurate. If the question of feeding, or of cultivation, or of selection of seed for certain conditions comes before the farmer for solution, he should know where in his text book to find what he requires. This use of the text book, namely of reference, is a far higher advantage than merely to read the book from cover to cover and then to lay it aside as finished.

The farmer who is merely a farmer is not living up to his privileges. A farmer may be none the worse in his business if he is at the same time a public-spirited citizen, but in order to be the latter, he must be intelligently acquainted with public questions. He should be informed on public questions which relate particularly to his own business, namely, the tariff, the control of markets, the marketing of produce, and trade and commerce. Also, he should be acquainted with the wider public questions that affect the welfare of the country, such as public ownership of public utilities, and of purity in elections. These propositions do not need arguing; they will be conceded by every reasonable person. The question before us is, how may the farmer best acquire a knowledge of these matters?

Just as in his business interests the agricultural paper should be placed as first in importance, so in his public interests the newspaper is the chief source of information and instruction. This statement is made with due regard to what is called the newspaper peril. The misuse of good newspapers is very common. The larger questions on the editorial page are entirely overlooked by many readers, while they seek out sensational material, scandals, and news of sport. This is one form of newspaper peril. Another form consists in the character of the paper itself. Papers with scare headlines, glaring colored prints of scandalous happenings, sensational news, stories with respect to the degradation of humanity—in other words, the yellow journals—are a serious form of peril to modern society. Fortunately in Canada we have little of the latter. Men must learn to choose and select, even from our good newspapers, those columns which foster intelligence and character, rather than those which appeal to the unhealthy craving for excitment. In spite of its perils, the newspaper is an indispensable means of education in modern society, and it is the farmer's duty to himself and to the public to make himself acquainted with the large national questions of the day, and this can best be done by reading a soberly-conducted high-class newspaper.

In addition to the newspaper, a magazine is good supplementary matter. It is unfortunate that so many of the magazines in circulation in Canada to-day are of American publication and of American spirit. There are, however, good Canadian magazines from which the intelligent man may make his choice.

In the question of reading for the home, the farmer's wife and daughters are not to be left out of account. The interests of the house are different from the interests of the farm, and if the farmer provides himself with a good agricultural paper that helps him in his work, it is only fair to say that those who do the work of the house should be equally well provided.

Reading for the children, whether in the farm home or the city home, is of importance second to none. It is in the period of childhood that, if ever, the habit of reading is formed, and the taste for good or for bad literature is formed at this age. It is the parent's business to see, therefore, that the child acquires a correct habit of reading. Parents are often puzzled to know what they should allow their children to read. Through the medium of children's books ideas are gained which have to be set aside in maturer age. Fairy tales and stories of Santa Claus are the stock in trade of those who minister to the child mind, and the wisdom of giving to the children fancies from which they have to be disillusionized when older is sometimes questioned. The disillusionizing is a process in the development of character which is inevitable. The child mind is fed and nourished and developed to maturity in exactly the same way as the mind of the race has been nourished and developed to maturity. The first literature of mankind was poetry in form, and in matter, consisted of tales of wonder, myths, fairy stories, and anecdotes of miraculous doings, and heroic achievements. The imagination of the primitive mind was fed by this sort of material, while reason was of later development. We may take a lesson from this historical fact in ministering to the wants of the child mind. It is the imagination that requires first attention. There is natural to the child mind a sense of wonder, an aptitude for admiration of heroic acts. These things should be given in the reading furnished to children. Nursery rhymes, fairy tales to begin with, then books of travel and adventure. The speaker remembers with what delight he read in early boyhood the books of such writers as Kingston and Ballantyne. These writers are, perhaps, now replaced by Henty, Kipling, and Bullen, but the principle is the same.

In speaking of reading of this sort, we must not forget the dime novel peril. The dime novel is always cheap and nasty. Cheap in order that its nastiness may all the more readily be foisted upon the public. Its danger lies in its presentation of false and distorted views of life, holding up for the admiration of boys and girls mock heroism. This dime novel peril is a very real and a very grave one, and the peril of it can best be avoided by preoccupation. The craving for the unwholesome, cheap dime novel is not a natural one but a cultivated one. What is natural is a desire for witnessing brilliant and heroic action. If in the child's hands are placed books that satisfy this desire in a wholesome way there is little danger of the dime novel taking possession of his thoughts.

This last question is one which concerns not the farmer only, nor the farm home only, but every parent and every home in the land. If the youths of to-day are to grow up into intelligent men and women of the next generation, it is the parents' business to insure that, by safe-guarding the habit of reading. In this, as in all other respects, "the child is father of the man."

Mr. W. L. SMITH: In discussing this subject I wish to speak chiefly of the value of agriculture bulletins. These hold an intermediate position between the agricultural paper and agricultural text books. The Department of Agriculture issues bulletins which deal with the topics of the day in a more correct way than agricultural papers possibly could. I think every farmer should make it a point to receive all the bulletins issued by the Department of Agriculture of Ontario. A friend of mine has made a point of getting all that are issued by the Departments at Ottawa and Toronto, and he has one of the most up-to-date farm libraries that I know of. You have no idea how much information can be obtained, of the greatest possible value, by simply filing away these bulletins in a proper way.

Mr. Walter J. BROWN: I have been very much interested in listening to Prof. Reynolds on this exceedingly important question. I think his advice is along right lines, but it seems to me he omitted one important point in connection with the Agricultural department of the newspaper, and that is the practical importance of market reports. The farmers in this country are excellent crop producers, but they are not business men in the sense that they ought to be, and they are not as familiar with the market reports as they should be. They are not reading them as carefully as they ought to read, and it seems to me that should be one of the first things and one of the most important things in the farm paper.

I was rather surprised to hear Prof. Reynolds say that the farmers' library should be practically for reference only. I do not believe in that. When I was on the farm, every agricultural book I could get I read from cover to cover, and I believe every farmer's boy who starts out in life with the right idea about agricultural education will read every agricultural book he gets. Many a time I have had interesting discussions with my father and with our neighbors with reference to the teaching of certain agricultural books, and many times have I heard agricultural books that were written fifty years ago quoted in these discussions.

Dime novel reading is a serious injury to this country, but there is another class of books which are almost as injurious, and they are the goody goody Sunday School books. Probably some people do not like this way of putting it, but the average Sunday School library is about as wishy-washy a thing as you will find in a day's travel. There are a few books in the average Sunday School library which appeal to the spirit of manhood or womanhood in boys or girls; or appeal to those things which are necessary to develop that manhood or womanhood.

Prof. REYNOLDS: I was thinking of the practice that was brought to my attention by reading a newspaper item which stated that a farmer thought he was doing good business by keeping the back files of the agricultural paper and stopping the paper. This was using the paper as a text book, and I think that is putting it in its wrong place. The information given in agricultural journals does not profess to be exactly scientific enough to take the place of the text book. We should not merely read the text book from cover to cover but we should keep it as a book of reference.

Prof. McCREADY: I am a school master, and it seems to me that a great deal of this valuable literature which is published through the Department of Agriculture is not finding its proper use; largely because the people are not properly instructed as to how to handle it. It has been our aim at the College to bring to the attention of the teachers the great amount of information that can be obtained from the bulletins issued by the Department of Agriculture. I think every school teacher in Ontario should know about these things and get the children interested in them. We have found the Department of Agriculture of the United States just as ready to send us their bulletins as is our own Department, and we have also found them very generous in answering any letters of inquiry sent by our teachers on any subject. A good deal of attention has been paid to building up libraries in schools, and they should have all the bulletins published by our Government, and these bulletins should be used by the teachers.

Mr. HOLTERMANN: We frequently find in the country, and also in the cities, that only one newspaper is taken, and this gives you only one side of the political question. If we are worth anything as citizens we are only worth it to the extent that we are willing to sit down and weigh political matters judicially. To take a newspaper which only gives you one side of the question is to cater to a great extent to prejudice, and I would advocate that those who wish to hold sound and independent views on political matters, should take two papers. If the agricultural class wants to make itself felt in public and political affairs it must study both sides of the question.

IMPROVEMENT OF PLANTS AND ANIMALS.

By Prof. W. M. Hays, Washington, D.C.

It is with great pleasure that I bring you greetings from the United States Department of Agriculture. Modern facilities for the easy transportation of thought, and for travel, have resulted in the fullest reciprocity between nations, in science and in those products of science which are bound up in the economic potencies of new and improved forms of plants and animals. As the oncoming great work of plant and animal breeders produces more and more important varieties and breeds, these hereditary potencies will aid other forces, scientific, educational, political and religious, in binding together the peoples of the earth into one harmonious family. The educators, the scientists and the breeders interested in the agriculture and country life of North America do not recognize international boundaries in their interchange of ideas nor in their exchange of valuable forms of plants and animals. Even in our most important show contests, international lines are almost ignored.

I wish also especially to bring greetings to this Agricultural Experimental Union from the American Breeders' Association. This is not a greeting from the United States alone, because that association is an international North American Association, with members also in countries of all continents. It was formed to promote the organization of research in plant and animal improvement and to bring about adequate organization to make over the plant and animal forms used by man. Every month of this organization, now in its third year, its mission seems larger and larger as well as clearer. A fair percentage of the one thousand members are Canadians, and I especially invite each and every member of this union to join. Your objects and those of that organization are so similar that I am sure you will pardon the statement here that the annual reports, containing papers and discussions by the brightest scientists and breeders, are alone well worth the money; besides, the membership fee of $1 per annum aids the work. May I also invite and urge that many individuals and also your societies of agriculture, horticulture, live stock, dairying, etc., take the twenty dollar life membership. The next meeting is at Columbus, Ohio, January 15-18, and a meeting should, at no distant day, be held in Canada. Your societies should send representatives to this asssociation, which is rapidly growing into a strong and widely-recognized organization.

I wish to pay my compliments to your agricultural Experimental Union, and to those who organized and have guided its work. It is one of the very brightest stars in agricultural organization in the world. Here the State, the largest and most important of all co-operative agencies, cooperates with the individual. By delegating to the State those things which require centralization, and reserving to the individual those things best done by private effort, you here recognize one of the most profoundly important principles of social organization. Individualism in co-operation builds a stronger civilization, and makes a better average citizenship, than service in corporations. Agriculture is peculiarly adapted to the plan of delegating to co-operative organizations some of the general work, as the creative part of plant and animal breeding, the manufacture of dairy products, the selling of wheat and cotton, and the education of the farm youth, leaving to the family the business of producing the raw products of food and clothing. And the lessons secured both from failures and successes in co-operation in rural affairs, in this and other continents, give an exceedingly broad and strong foundation for the hope that the application of this principle may save that most important world's organization, the combined unit we on both sides of the boundary so well know as the American farm home, from the modern tendency to centralize all industries in the hands of the few. The Experiment Station at Guelph has done much to preserve the farm home in Ontario. It might have distributed its valuable new varieties of crops through large and powerful seed firms, but your wise scientists and departmental administrators who also had the wisdom of statesmanship, sought to distribute them through you. The decision thus to organize you in this union has better distributed the profits from seed dissemination; has made a more complete distribution of the seeds; has kept the varieties up to better standards, and has added to the stature of the manhood of a large membership in this Union. Your plan and its results have been an inspiring lesson for every country, state, and province in the world.

For a century animal breeding occupied the center of the stage, but with the new century, plant breeding came into prominence. Mendel, deVries, Vilmorin, Burbank, Saunders, Zavitz, Webber and other pioneers having produced important results, which by profound physiological changes and by highly important economic betterments have forced upon the world the fact that our plant forces can be made more potent. A century of practical animal breeding under intense competition in show ring and sale barn had clearly brought out the fact that the individuality of a sire or dam is highly important. Animal breeders were slowly learning that supremely important fact that among these choicest individuals of a species, breed or variety, there is an occasional animal with very marked power to project his or her superior character permanently into the generation of his or her progeny, and that such individuals, or a small group of such individuals, may be used as the progenitors of an improved breed, or variety.

Plant breeders with a knowledge of the animal breeder's philosophy and with the opportunity, denied breeders of animals, of using very large numbers, soon began to broaden the philosophy of creative breeding. Some, with varieties best selected by mere art, and others, with varieties requiring the exact methods of recorded lineage and performance pedigrees, soon brought into the clear sunlight this most important law in creative breeding, that there is an occasional plant or animal, say one in thousands or one in ten thousands, the blood of which has the power to produce an improved breed, variety or family. DeVries and other scientists at about the same time, emphasized this law in practical breeding, by demonstrating that in nature there are mutations so powerful in lines of new heredity that from mutating individuals new varieties and even new species arise as if by magic.

Creative breeding is more and more being recognized as a systematic quest for the animal or plant with the transcendant breeding power the blood which may be multiplied as a valuable new form; as a scientific hunt for economic or artistic mutants.

Breeding is coming more and more to be divided into creative breeding—the business of multiplying pure-bred stock, seeds, and plants, and the use by practical growers of the pure-bred new forms. The highly trained specialist, whether he be a public official, an employe of a firm or co-operative association, or an amateur, must guide the creative breeding; though many new things of value in both plant and animal breeding will be found in practical breeding and in the growing of pure-bred and grade or hybrid stocks of plants and animals. On the other hand, the business of producing for sale pure-bred animals and pure-bred seeds and plants for sale to growers of animals and plant products, will develop in volume and in efficiency.

In both plants and animals much of the creative work may be done by the use of public funds under which the trained official can give assistance, method, permanency and accumulative assistance and efficiency to the cooperative association striving to breed for a specific purpose.

Importance of Plant Breeding. The Province of Ontario and the State of Minnesota each has, broadly speaking, 10,000,000 acres of crops which may be improved by modern methods of breeding not including most wild pastures and most forest crops. These breedable crops at ten dollars per acre are worth $100,000,000 annually. Ontario and Minnesota have led in point of time in developing state plant breeding establishments and in proving two facts of mighty import to these commonwealths and to the world. The first of these facts is that the world's staple crops can be so improved in their powers of heredity, that they will yield twenty five per cent. more value per acre. The second of these facts is that this remarkable increase can be accomplished at a cost of one-tenth of one per cent. of the increased value of the crop.

It is worthy of statement in this connection that these same two commonwealths have been prominent in working out systems of improved farm management, providing conditions of crop rotation, fertilization, cultivation and marketing under which the crops will yield nearly another twenty-five per cent. of increased value per acre. It should be recognized that though the improved conditions under which crops are grown must be provided each year at a cost of probably half the increased values, improvements in breeding once made are continuous. Both methods of increasing the net income per acre and per worker pay; but the method which deals with the fundamental heredity of our wild and our half-civilized plants is the more potent and marvelously the cheaper.

Applying these remarkable figures to either of these commonwealths we have the following for a forty-year period, twice the length of time the experiment stations at Guelph and St. Paul have already been at work on the preliminary parts of this problem.

Twenty-five per cent. of $100,000,000 annually is $25,000,000, and this multiplied by forty years gives $1,000,000,000 as the increased production for one of the commonwealths in forty years. One one-thousandth part of this is $25,000 annually, or $1,000,000 in forty years. The difference is $24,975,000 annually or $999,000,000 in forty years. Applying these same figures to 250,000,000 acres of breedable crops in the United States, we have an annual cost of $625,000 or for forty years of $25,000,000, annually producing increased crops valued at $625,000,000, or for the entire period valued at $25,000,000,000, at a cost so small that the practical statistician would call it a negligible quantity.

Since the size of these figures makes the footings on the ledger sheets of Intercontinental Railway companies look like pigmies, and are second in size only to the products of a commonwealth or a nation, they are foolish unless they can be justified. If they are based on sound evidence they represent an economic enterprise of more concern to legislative bodies than all their tariff and taxation schedules combined. If the proposition is one-hundredth part true; that is, if the cost of breeding should be ten times the estimated cost, and the increased yield of crops possible thus to produce only one-tenth that claimed; still the cost would be only one-tenth of the increased production. Even this increase in production at this relative cost in any great transportation or manufacturing enterprise would be seized upon by our great captains of transportation and industry with the utmost avidity.

Those of us who have seen the variable wildling or the cultivated species obediently change under our hands to forms with higher economic power; have sought in the literature of breeding and in Nature's book to learn how to lead plants to a life of higher utility; and have wrought to design methods of handling the plants and of organizing plant breeding, have now come to the point where we assert that this subject commands the attention of our leading statesmen and our most potent organizers of industrial enterprises. If even the most modest of the above figures be true, they are of wide import to the Hills, the Van Hornes, the C. M. Hays, the Morgans and the Harrimans, because they point the way to enlarged freights and increased prosperity on the lines of railways these gentlemen control; and they are sufficiently important as affairs of state to warrant prominent places in the messages to legislative bodies of our governors, premiers, and presidents.

Proof of Enormous Profits from Plant Breeding. Twenty years ago, and eighteen years ago, respectively, the Ontario and Minnesota Experiment Stations began the work of improving the field crops of these commonwealths. For more than a decade the workers in each of these institutions, working independently, devised their own methods. These methods were different in many respects, but in each case they were alike in that they attacked nearly the whole range of the staple field crops of the commonwealth. Only during more recent years have the experimenters had the benefit of the methods worked out by each other, and of similar efforts abroad and in other American commonwealths.

The Ontario station used improved methods of seed and plant selection with early and carefully planned distribution of the very best varieties to co-operators in the Ontario Experimental Union made up of ex-students of the Agricultural College here at Guelph, and of other enterprising farmers of the Province, from whom reports were received annually.

The Minnesota Station used the more technical methods of dealing with the individual plant and its breeding power, with distribution necessarily longer delayed, and by the sale of seeds at high prices to co-operators trained to be growers of pure-bred seeds. The time for a comparison of the two methods came some years ago and both stations, as well as many other similar stations, are combining the best of these two general methods, and of methods arising in other places, together with ever-recurring improvements, into systems of plant breeding and distribution which promise to be most efficient.

It must be understood that the methods used were at first not so efficient as those now in use, and that the results stated below would be still more striking had present methods been available from the beginning.

Proofs of Improvement in Ontario. The Ontario Agricultural College, as stated by Prof. C. A. Zavitz, has introduced into the variety tests on its experimental farm about 2,000 varieties of field crops. This testing has been followed by the persistent improvement by seed selection of those varieties proving best, and by the yearly distribution through the Experimental Union of the latest and best improved stocks. Table I shows how these improved stocks have compared under the condition of these experiment station tests with some of the leading standard varieties used in the Province. Here no factors entered to give differences in yields save the hereditary powers of the respective varieties. The experimenter's skill here, introduced, discerned, and improved those which through a long series of years proved to yield the largest value per acre.

These are the varieties multiplied by the College and widely distributed through the members of your Experimental Union to the farmers of the Province.

TABLE 1. COMPARATIVE RESULTS IN PLOTS AT ONTARIO AGRICULTURAL COLLEGE OF SOME NEW AND OLD VARIETIES.

Varieties.	Years Tested.	Per Acre Bushels.	Increase Per cent.
Siberian Oats	16	88.2	23
Black Tartarian	16	71.5	....
Mandscheuri Barley	16	69.8	19
Mensury Barley	16	58.7	....
Dawson Golden Chaff W. W	10	57.3	11
Early-Red Clawson	10	51.6	....
Empire State Potatoes	16	231.0	13
White Elephant	16	203.7	....

Table 2 shows the yields per acre of Ontario's entire area of winter wheat, barley and oats for the first ten years of this work, before these varieties had been much improved, and for the second ten year period, just closed.

TABLE 2. AVERAGE YIELDS IN BUSHELS PER ACRE FOR ONTARIO.*

	10 Years 1887-1896.	10 Years 1897-1906.	Per cent of Increase.
Winter Wheat	19.2	21.7	13
Barley	24.8	30.6	24
Oats	32.2	33.3	19

It will be observed that, generally speaking, the improvements shown both on the experiment plots and on Ontario's entire acreage range between ten and twenty-five per cent. It is not claimed that all the increased yields are due to improvement in hereditary values of the varieties planted, because it must be recognized that crop rotation and a better knowledge of what systems of rotation are best, and better cultivation, have contributed to this result. On the other hand, it must be recognized that the new wheats, barleys, oats and potatoes have as yet carried their increased powers to only a part of the acreage. It must be further recognized that not only have the yields been materially increased, but that the oft-mentioned gradual decline in yields of twenty to fifteen years ago has been turned to a sharp increase in yields per acre.

In Table 3 are shown the acreages of the leading field crops of the Province, aggregating over 10,000,000 acres. It will be observed that winter wheat, barley and oats occupy about 4,000,000 acres. By applying to these the percentage figures in Table 1, on a valuation of ten dollars per acre, we have about twenty per cent of $40,000,000, or $8,000,000. Assuming that half of this is due to the improved varieties distributed, and the other half to better farming, we have $4,000,000 per annum, or $40,000,000 for the ten year period just passed. Improved varieties of spring wheat, peas, potatoes and of other kinds of crops have also been disseminated, which would considerably swell this sum. The cost during the ten-year period, of all the work on all kinds of crops which may properly be charged to the improvement of field crops has been under forty thousand dollars. The expense is clearly within the one-tenth of one per cent of the improvements perfected. Other lines of proof might be deduced from Prof. Zavitz's brilliant work in Ontario, and similar proofs can be found in the work of Dr. Saunders at Ottawa.

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*According to Reports of Bureau of Industries.

TABLE 3. AREA OF FARM CROPS IN ONTARIO, 1906.

Crops.	Acres.	Crops.	Acres.
Winter Wheat	787,287	Corn for Husking	289,456
Barley	756,163	Corn for Silo	180,796
Oats	2,716,711	Potatoes	136,064
Spring Wheat	171,745	Mangels	69,353
Peas	410,356	Carrots	4,980
Rye	79,870	Turnips	132,512
Beans	51,272	Hay and Clover	3,069,917
Buckwheat	106,444	Pasture	3,349,101

Proofs of Improvement in Minnesota. The Minnesota Experiment Station likewise has introduced, or bred, and tested varieties of field crops numbering into the thousands. There, instead of an early careful selection, as by taking the best seeds from the best heads, the standard and introduced varieties proving best were usually first passed through the severe discipline of the plant breeding nursery. The stocks which proved superior there were afterwards placed in the variety tests and those there gaining the ascendency were distributed.

This longer process necessitated a greater delay of distribution than did the Ontario plan. The Minnesota proofs, therefore, cover shorter periods than the Ontario proofs, and afford a different form of the proof of the profits arising from plant breeding.

Minnesota No. 13 corn secured and subjected to nursery breeding in the early nineties has been distributed for a decade along the northern zone of the corn belt in Minnesota and adjacent states. It has been one of the leading factors in pushing the dent corn belt to the northward in these states, and has been the leading dent variety used for thick planting in the production of short-growing, fine-stalked fodder corn and ensilage for the north zone of the dairy belt. Its value is represented by figures expressed in millions of dollars.

Minnesota No. 163 wheat, and Minnesota No. 169 wheat, bred by nursery selection from the common Fife and Blue Stem spring wheats, which were supreme in Minnesota till seven years ago, yielded four and six bushels respectively more than their parent varieties on the University farm during their regular field tests trials, and 15 to 18 per cent. more, respectively, than the wheats of the state on the farms of the several hundred pure-bred seed growers to whom they were first sold. These wheats are estimated as already covering upwards of two millions of acres and adding an average of two dollars per acre to this crop. It seems conservative to estimate that this will continue for five years before they are overtaken by better varieties which are springing from the Minnesota station and from other breeding centres. This represents the sum of $20,000,000 of increased production. All the expenditure to date on breeding wheat is well within $20,000.

Primost flax, produced under systematic nursery plans, yielded 21 per cent. more in the field test trials at the experiment station, and when forty-eight growers of pure-bred seed, to whom it was sold, tested it beside the common flax grown for seed, it yielded 15.0 as compared with 11.9 for the common flax, or a gain of 25 p.c., worth three dollars per acre. If, as seems a fair assumption, this variety of flax before it is overtaken by still better varieties promised from the Minnesota and Dakota Experiment Stations, covers one-half Minnesota's acreage, or 200,000 acres, for five years, or a total of 1,000,000 acres, with an increased value of $3 per acre, its added hereditary power will have produced $3,000,000. The production of this variety cost the State of Minnesota and the United States Department of Agriculture, which are co-operating in this work, less than $3,000.

Still other lines of proof might be deduced from the work of these two stations and the work of the two governments and of numerous states and provinces, also the achievements of private breeders might be drawn upon for probably even more convincing facts as to the profits arising from scientific breeding.

The prominent fact that stands out for the new century to deal with is, that this work pays fabulously. In my native state, Iowa, we say that the soil is a streak of pay dirt that turns out a crop averaging a million dollars for every day in the year; and will turn over and repeat the $365,000,000 trick every year. The highly developed state breeding establishment of the future will easily turn pennies into dollars and even into eagles. Nature admonishes us to harness fire and electricity and heredity, all too long allowed to run wild.

Perfecting Plans for Plant Breeding. The Experiment Stations and Departments of Agriculture which see clearly this rising proof of the immense profit to all the people from the expenditure of public money, should be economists enough to rapidly broaden out their plans to meet the situation in its largeness. When legislative bodies see clearly what those most experienced in plant breeding under public expenditure now see, they will be ready and eager to finance this work. They will only ask if plans are developed, if sufficient workers are available and as to the amount of money required which can be economically used.

Heretofore the pioneers have each worked too much alone. While this has resulted in originality of method, necessity being here the mother of many inventions, the time has come for more conference, more references of written plans for the criticism of other workers along similar lines, and more team work in devising specific, practical plans for each experiment station, each worker, each species; and for each local and each theoretical problem. The problem of creative breeding in plants and in animals is made up of long-time propositions. These projects require that the man and the materials in the form of varieties or breeds, be together for a long series of years. The work must be so organized that the successful workers will have long tenures of office. This work requires broader synthesis of unit characters than is required of the synthetic chemist. There are greater artistic opportunities here than in sculpture and painting combined, because the breeder fashions his artistic products not only as to form and color, but as to action, fragrance, flavor, food value and as to a thousand and one characters of texture and other qualities giving peculiar value and artistic forms to raw and manufactured products. The primary colors which the painter fashions into an infinite variety of imitations, are but one group of the units which breeders command in producing artistic and economic realities. The breeder combines science and art in directing the teeming impulses of organic nature to make her forms more various and more valuable to man.

In case of every group of varieties there is need of plans along certain lines which may already be fairly well defined, and these plans gain definiteness if placed on paper and are there built up under the critical analyses of several minds working along the specific line in hand or along related and more general lines. In case of breeding each group of varieties for each specific condition of locality, production, or use, the object to be sought, the lines along which desired changes are to be made, should be closely defined. The methods of procedure, also, should be wrought out step by step, as experience adds knowledge wherever and by whomsoever gained. These statements of purpose and plan should be revised; changing plans, however, only when other considerations outweigh the advantages of continuity along the previously prescribed lines. Thus, there is need of definite plans as in each state breeding spring wheat, in each state or valley needing better winter wheat, in each region needing hardier red clover, in each agricultural area needing better pasture timothy, in each area with soil and climate peculiarly favorable to peaches, in each group of counties requiring a special kind of corn, and in each class of greenhouses devoted to the culture of a given flower or vegetable.

The American Breeders' Association has appointed on its more than forty committees over two hundred men who are beginning the work of encouraging the production of such plans by each breeder as will suit his needs. These committees cover animal breeding as well as plant breeding, and it seems not too much to hope that their reports during the next several years will mark efficient organization in breeding in the North American continent. Not only must each species be dealt with, but the broader administrative questions of organization, and especially of seed and plant introduction, must be wrought out. For example, the Ontario plan of distributing selected field seeds through this Agricultural Experimental Union, and the Minnesota plan of distribution through growers of pure-bred seeds, nursery-bred seeds, will ere long be capable of comparison as to their relative efficiency. One plan may prove superior to the other; or, what is more probable, a combination of the best elements of the two plans may best serve in building up the yields per acre and per worker of these and other great commonwealths. Let there be friendly rivalry in comparing the efficiency of these plans, and especially in seeing who can work out of the two plans the best plan for the future.

Evolution of Animal Breeding. The change in plant breeding from very little and poorly organized work to a mighty movement at once scientific, artistic and economic, is quite revolutionary. The development of animal breeding, on the other hand, from the fairly satisfactory methods of the past century are only evolutionary. The suddenly increased interest in plant breeding, the discoveries of Mendel, de Vries and other plant scientists, the development of scientific and artistic methods of practical plant breeders, and the widely recognized results of plant breeding, have been among the prime causes of renewed activities in animal breeding. However, no one should underestimate the potency in the movement started decades ago by Wallace to apply performance records to trotting horse pedigrees. The advanced registries of dairy cattle and the systematic use of performance pedigrees in dairy breeding are showing breeders of other classes of animals that breeding powers of parent animals and of fluxes of blood, are measured only by the average values of the progeny and that scientific records of performance are the chief value of lineage pedigrees. The work done in Ontario under the Hon. John Dryden in organizing the breeding of bacon hogs is one of the first and tallest milestones in public organization of animal breeding.

Animal breeders are coming to see that the milking Shorthorns, the Vermont Morgan horses, and other most important foundation stocks have been neglected and almost lost, while statistical records of the performance of animals both as to their individuality and as to their breeding power, would have resulted not merely in the preservation of these valuable types, but in their development into breeds of the higher value. Canada has been no less at fault that the States in too narrowly adhering to mere outward appearance of the rare animal in most of the meat-producing breeds, giving relatively too little attention to the more vital facts as to the average value of the individuals of the family of animals in strong fecundity, in resistance of disease, in feeding power and in general ability to yield money per herd on the practical farm.

The new movement in breeding is bringing to animal breeding many new philosophies and new problems of business practice. The opportunity to use large numbers in plant breeding has resulted in showing that the farm herd of pure-bred stock, generally to be dispersed on the death of the owner, is entirely too small a unit for efficient work in the creation of those new animal values which modern breeding results have shown to be possible. Animal breeding must be organized on a broader basis or it cannot keep up with the creative work already assured in plant breeding.

The American Breeders' Association in seeking to bring about wide co-operation in the consideration of the improvement of our domesticated and wild animals, has appointed a number of committees. While the interests in game animals and birds, in fur animals, in fishes and in pet stock are being considered, the large questions concern the great meat, milk, wool, egg and work-producing animals. Two billion dollars worth of annual production along these lines in North America during the next forty years will increase without material improvements by breeding so as to average more than three billions annually. Under material improvements in breeding effected in part by the expenditure of public money, this can surely be increased ten per cent. This would amount to $300,000,000 per annum. The sum of $12,000,000,000 for forty years is a very large possible goal. The public cost of all work practicable to do in animal improvement towards affecting the result, could hardly amount to one per cent. of this sum. Since the world is no longer satisfied to deal with its largest questions in a local or in a provincial way, those interested in problems of breeding animals will be excusable if they look to even larger units than our herd book associations and the individual breeder in their efforts at creating new values in their horses, cattle, sheep and hogs.

One plan for effectively improving the breeds of animals under consideration comprehends the utilization of large numbers of long-continued efforts with a given stock of animals, of scientific methods in securing records of individual excellence and of breeding power, and of more effective means of highly accrediting to growers those fluxes of blood which have the highest merit when submitted to the crucial test of highest production of profits on the practical farm.

This discussion has been centered around what may be termed a plan for *co-operative circuit breeding.* This plan contemplates public and private co-operation. It provides for the use of public funds to provide scientific direction, for expert testing, and for the keeping of lineage and performance records, and to insure long-continued efforts along well-defined lines, to record highly authenticated proof of excellence of many superior animals to be sold to the public, and for the gradual accumulation of scientific knowledge of breeding and of practical plans for bettering our live stock. The plan contemplates that the individual co-operative circuit breeder shall purchase, produce under public supervision, and sell to those whose business it is to produce pure-bred animals for growers, superior males and females, with which to improve their pure-bred herds so that they in turn may supply to growers animals of higher average excellence, that our general live stock may be more highly and more truly up-graded.

The machinery suggested is that there be organized about each of numerous centres, as experiment stations, a co-operative association of twenty or more farmers such as is now being organized in the vicinity of the Minnesota Station to breed milking Shorthorns; that each member agrees to purchase at least the minimum number required of females and one male of approved quality; and to care for and breed them according to the prescribed plan; and that the co-operative association act with two public officials, the three serving as a managing board. The plan contemplates that this managing board, or Circuit Council, shall appoint a circuit superintendent through whom the public money shall be spent, and who will aid the individual co-operation in securing their foundation animals; in devising good and uniform methods of caring for, breeding and testing the animals, and who will supervise the making of all records.

The distribution of the valuable resultant stocks of animals under private ownership seems well provided for, by dividing the animals into three classes, the first and best of which shall be sold under open competition within the association; the second class, which may be sold as pure-bred stock to outside breeders, and a disqualified class which cannot be registered. This plan retains not only to the individual circuit breeder an independent business, but builds up rather than jeopardizes the private business of the regular outside breeder of pure-bred stock,—as some plans for public aid to animal breeding might do. It preserves individualism under co-operation.

Breeding Wheat.

The following is in very abbreviated form, the supplemental oral statement made in connection with illustrations, stereopticon views and moving pictures showing the actual operations of breeding field crops at the Minnesota Experiment Station:

Wheat will serve as the crop to illustrate the rather formal and scientific methods of breeding in use at the Minnesota Station. During the years 1888 to 1892, the temperate climates of the world were ransacked for better varieties of spring wheat than were already in use in the state. When it began to appear that Fife and Bluestem wheat, almost universally used in the state, were probably better than any of the newly acquired kinds, the problem was changed from depending wholly on new sorts, to making from the old varieties new kinds of greater value. Three kinds of effort were soon started to improve the old wheats: (1) by scientific selection; (2) to first mix the blood of two or more varieties and then apply selection to these more variable stocks; and (3) to make researches on how to breed wheat and other field crops.

The following outline gives the general plan for breeding wheat by selection. Each of the several best varieties are used for foundation stocks. The breeder goes into a field of a given variety and selects two pecks of the largest, strongest best filled spikes of wheat from a given variety. These are shelled out head by head and several superior seeds are taken from each of the heads containing good wheat of good quality, thus securing ten thousand seeds. Or, if the start is made in the spring, the breeder selects the ten thousand seeds from the bin of bulk wheat.

A plot of uniform land suited to growing wheat is prepared so as to have a finely pulverized seed bed. With a nursery planting machine devised for that purpose these seeds are planted in hills four inches apart, one seed in a hill. Two men operate the machine, one dropping the seeds in each of fourteen cups, which when thrown over deposit the seeds in fourteen tubes four inches apart, and extending two inches into the soil. The other operator by means of a lever throws the machine forward four inches, thus checkrow-planting the individual seeds. The weeds are kept from growing in these plots in which the plants stool out and grow about as thick as in a wheat field as ordinarily planted in field practice.

When the grain in this foundation bed, as it is called, is ripe, a careful man with grass hook or sheep shears clips off and removes all plants which are not among the strongest. Using care in the later selection the best five hundred are left standing. The several heads from the several culms from each of these individual plants are now harvested and placed in a large envelope. Envelope of one stock of paper only are used, so as to be all of one weight, and the envelopes and contained heads of wheat are weighed, that those weighing lightest may be thrown out, thus to avoid further expense. The two or three hundred remaining are now shelled and the neat grain is weighed and is also graded by inspection for market and milling quality. About one hundred of the plants yielding heaviest of superior grain are now chosen out of the lot for mother plants, and the respective stocks of seeds are given the honor of nursery names called nursery Stock Numbers, as " N. S. No. 1-07." " N. S. No. 2-07," etc., the '07 showing the year in which they were first entered in nursery plots. The second year the seeds from each of these mother plants are placed in centgener plat test. This word "centgener"—from "centum" and "genera," meaning one hundred of a generation—grew out of the need of a name for the one plat tests in which one hundred plants from each of numerous mother plants were grown to compare the breeding powers or variety producing efficiency of the blood of respective mother plants. When these plants are ripe the number actually reaching maturity in each centgener plat is determined by counting; the whole is harvested, threshed, and the weight of the neat grain is determined. The weight of the average plant is then determined by dividing the total weight by the number of plants harvested. The grade of the grain is determined by inspection, and the yield per plant and the quality of the seeds from the respective mother plants are then compared, and those making the poorest record are discarded, thus to avoid further expense on the unpromising nursery stocks. The remaining stocks are again placed in nursery plats the third and fourth years, and the half dozen averaging best in the three annual centgener plat tests are given the honor of being selected for trial in field plat tests.

When a variety goes from the field trial plat it is given a variety number, as "Minnesota No. 163," wheat and "Minnesota No. 169," wheat. Usually the seeds from the nursery plats are not sufficient in quantity for tenth or even for twentieth acre field test plats, and they must be grown for a year in increase plats, so as to secure sufficient seeds for the larger plats. Here for three successive seasons the newly originated varieties are planted and carefully handled with the ordinary drills and reapers, and with a special threshing machine. Here they are grown beside their parent variety and other good varieties. If one or more shows especial promise of large yield and superior quality of grain, it is increased for milling and baking tests, and other nearby experiment stations are asked to place it in their variety tests. A variety which comes forward victor in these tests is honored with a name—as the new flax, called "Minn. No. 25," when in the field plat tests, but when distributed to the farmers was named "Promost"—and is increased to one or more thousands of bushels, and is given the crucial test of commercial use by the farmers and the millers of the state. It is of interest to note that varieties which have successfully run the gauntlet of the experiment station tests have all made good among the farmers, grain merchants and millers. The work of breeding by selection does not stop with experiments started in one season. In successive years new foundation beds were started from original or improved stocks, and new varieties are a regular product, though, under this rigid scheme of selection only a very few of the supremely best varieties are distributed. These are kept clean of admixture and further improved by the simpler methods of selecting superior heads from strong, typical plants, both at the experiment station and on the farms of the growers of pure-bred seeds throughout the state.

The second method of wheat breeding followed is by hybridizing to secure new foundation stocks from among which to select mother plants. As will be seen in the above statement, the effort is to secure that rare mother plant which has the power to project into her progeny the heredity to yield more value per acre. The value of the future variety chosen depends upon the heredity of a single kernel of wheat. Selection consists in singling out the blood of that kernel. By crossing two varieties we hope to produce an occasional kernel of wheat the blood of which will have more value than that contained in any kernel in either parent variety. Hybridizing then, in wheat, which is self pollinated, is concerned with the attempt to produce an occasional kernel with blood of higher value than any in the parent variety, that it may be found and multiplied into a more useful variety of wheat. In other words, the hybridizing method consists in crossing numerous flowers from two varieties, increasing the resulting hybrid stocks for three or four years, and selecting from the best heads ten thousand superior seeds to plant in the foundation beds from which to secure one hundred or more mother plants, the nursery stocks from each of these to be run through nursery and field test trials as in breeding by selection alone mentioned above, that the one best blood line may be secured.

The distribution of new varieties is second in importance only to finding and creating them. The Minnesota station's method of breeding results in finding occasional varieties with at once marked improvement, thus differing from methods which earlier produce results less pronounced. Under this method of breeding, it has been found practical to establish high prices, double or treble elevator grain prices, and to offer new stocks to men who care to become growers of pure-bred seeds. The increased price of these seeds, highly accredited by the publications and the tabulated yields given out by the experiment station, creates a business, and puts a commercial movement behind the rapid and wide dissemination of these new seeds.

HON. MR. DRYDEN: Prof. Hays has been talking to us in figures, of the benefits that will accrue to us from this kind of work, and, in taking notes while he was speaking, I put these words down, "unthinkable figures." Did he not say something about $999,000,000? You young men can understand that, but I cannot take it in. I cannot get hold of it. They are really unthinkable figures to me. What I want to say is this, that notwithstanding the impression it makes upon me, the principle he has enunciated is absolutely sound. In one of the last speeches I made in the Legislature I was talking about the benefits which had accrued from this and other organizations in connection with this College, and I have frequently said that I would just as soon undertake to produce 80 bushels of barley per acre on my farm to-day as years ago I would undertake to produce 60 bushels with the old kinds of grain we grew. I know it can be done, simply because I have got a better variety of barley, and when I increase my products in that way, and my neighbor increases his, we soon get to these great "unthinkable figures." No wonder that the railways say their traffic is increasing, and they do not know what is increasing it. Very likely they have not studied it out; but there it is. They have to get more cars in order to carry the products out of the country, and we have heard over and over again during recent years, of the enormous increase in the deposits in the banks. What has brought this about? I tell you this very organization here—this organization that had such a small beginning has done perhaps more than any other single organization in bringing it about—scattering these new varieties, these great yielding varieties all over this country. Mr. Hays never made a statement that was stronger or truer than the one he made here just now when he said, it pays fabulously. The politicians do not understand it, the vast majority of the people are not thinking anything about it, but all the same the work is quietly going on; and I want all you young men to stand by these organizations which have for their object, not only the increasing of the fertility of our soil, but also the production of better varieties which will enable us to increase our yields. I had the privilege of meeting Prof. Hays at the World's Fair, and also several other men who, like him, were interested in this line of work, and I was surprised when they told me that the principles underlying this plant breeding were precisely the same as the principles underlying the breeding of live stock. I have never forgotten it, and I have been more interested in this work ever since than I ever was before. You cannot do better than give this work every kind of encouragement. I am very glad to have heard Mr. Hays again, and I have been very interested in all he has said, and in these figures which he has given. (Applause.)

PLANT BREEDING.

BY PROF. L. S. KLINCK, STE. AME DE BELLEVUE, QUE.

We in Canada count ourselves fortunate, especially from the scientific standpoint, in that our neighbors to the South of us have such vast areas where the soil, the climate, and the natural conditions generally closely approximate those of our own country. Similar conditions have produced similar problems and in our attempts to solve them we may be mutually helpful. We count ourselves fortunate also in that the results of these investigations are published in our own language; but to-day we count ourselves especially fortunate in having with us the man who for almost two decades has been in the forefront of agricultural progress and research, and to whose untiring efforts in large measure is due the successful organization and work of the American Breeders' Association, an association broadly international in its scope and activities.

In Professor Hays, we have a man of prophetic vision, a man, who more than a decade ago was able to discern not only the signs of the times, but with larger vision foresaw the need for systematic long-period effort in improving the plants and animals of a continent. It is not possible to estimate at its true worth the value of his work without spending a few weeks at St. Anthony Park, Minnesota, where in wheats, Minn. No. 163, and Minn. No. 169; in barleys, Minn. No. 105, in oats, Minn. No. 26, and corn, Minn. No. 13, to mention but a few of the improved strains and varieties originated, and subsequently grown on tens of thousands of acres throughout Minnesota and adjoining states, testimony is borne to the fact that in some degree, at least, the vision of this pioneer in crop improvement has been realised.

The younger men just entering upon the field of plant improvement have, and rightly should have, small desire to speak when personally they have done so little; but I trust we have caught some of the enthusiasm of the forerunners in this movement, and having profited by their experience, hope to contribute our share to the great work of plant and animal improvement.

A decided advance was made, looking toward animal and plant improvement, when the American Breeders' Association was organized, an organization including both plant and animal breeders. An association of far-reaching influence in this country is the Canadian Seed Growers' Association. It is well that in the International Association, plant and animal breeders have been brought together. There is much each can learn from the other. Until recent years the improvement of plants had not been rapid. Even now, because of the presence of certain problems, not yet solved, progress is not as rapid as the demands warrant. The breeders of plants, building upon the foundation principles laid down by the breeders of animals, for many years followed their methods. But the plant breeders have certain advantages over the animal breeders, and the last decade has witnessed a pushing forward into new fields and the adoption of plans and methods suited to the needs of the work.

The animal breeder must necessarily confine his attention to comparatively few animals, because of their size, the cost of production, the value of the individual and the time required for them to reach maturity. Plants, on the other hand, are small in size, occupy but little space, require but little capital and mature in a few months, giving a splendid opportunity for the breeder to make a careful study of the product of each individual during the winter months. As a result, the breeder of plants can handle thousands when the breeder of animals can handle tens. With the latter the loss of a few individuals is not a matter of serious concern unless they be individuals of outstanding excellence. By means of chemical analyses, the gluten test, the baker's sponge test, or better still a complete milling and baking test, he can determine the relative economic value of the different strains of his improved wheats. In the case of oats or corn a close study of the physical characteristics will give a comparatively accurate idea of the relative value of the different strains. By using a part of the product of a number of individuals to determine the quality of the strain the work of further improvement need not be seriously interfered with, or progress retarded.

While the animal breeder generally confines his attention to creating valuable strains within a given breed, and rarely to the originating of a new breed, the plant breeder more frequently aims at creating a new variety with distinct taxonomic differences. While the differences have often been forthcoming, too often varieties have been produced which have added nothing of value to the already overburdened list we now possess. A new variety or strain which fails to embody some advance in some desirable character or characters over what we already possess is not only of no economic value, but, if placed on the market, is a decided detriment to the cause of improvement. Improvement within many of our standard varieties is possible and so long as marked variations exist judicious selection within the variety will not be barren of results.

We are constantly making progress in the direction of simplifying the mechanics of plant breeding. Any improvement in this direction which enables a breeder to accomplish more and better work in a given time is a direct contribution to the science of breeding because it makes possible the successful handing of a much larger number of plants. The creation of a literature of breeding will prove of inestimable value to the farmer, the student and the scientist, while co-operation of the National and Provincial Stations with Breeder's Associations, with individual breeders and with commercial organizations for the collecting and disseminating of information bearing on breeding problems will give an added impetus to the work.

As has been pointed out, progress is being made, but less rapidly than the importance of the work demands. Private enterprise has proven inadequate to a work demanding years of painstaking systematic effort. Until such time as the originator of new and valuable strains can reasonably hope to reap some pecuniary remuneration commensurate with the value of the public service rendered, private initiative will prove inadequate. The proposition is one fraught with such great possibilities that the work demands, and in many Experiment Stations is receiving some measure of Provincial State or National aid. These long-time propositions demand not only trained men but men with long tenure of office. Spasmodic attempts without a clear-cut definite aim are sure to end in disappointment and needless expenditure of time and funds. The results obtained by Burbank and Bailey in so many fields of plant improvement by Hays, in cereal, forage, and fibre crops, by Saunders in wheats and fruits, by Zavitz, in many of the small grains, by Hopkins in corn, by Hansen in hardy fruits, to mention but a few of the foremost breeders in the American plant world to-day are the direct result of Government aid, coupled with long-period tenure of office on the part of the breeders themselves.

Colleges, Experiment stations and sub-stations, when made the centres of plant breeding activities, touch large numbers of students, and in Ontario, thousands of active co-operators in plant and animal improvement. These experimenters, in turn, should become centres for the dissemination of information obtained not only from the experiment stations and from meetings of this kind, but what will usually prove more helpful from the work done by the members on their own farms.

We have been told this afternoon that in extending the natural bounds for the successful culture of crops the plant breeder is to-day literally creating a new earth. But the gulf between the successful breeder and the majority of farmers is very great. Fortunately this gulf is not fixed. Community of interests is producing co-operation in effort.

Importing and testing of promising varieties, hybridizing to produce necessary variations, and selection to fix desirable characters; the production of strains adapted to different climates, altitudes and soils, the production of varieties resistent to the ravages of diseases and insects, methods of starting foundation stocks, methods of selection, studies in the pedigreeing and distributing of strains of proven merit will long remain almost solely the province of the station breeder. Advanced farmers, in ever increasing numbers, will continue the selection of good plants with good heads and good grain. The average farmer will continue the judicious use of the fanning mill. The class below the average—and every Province, county and township has them, which makes no selection at all, is gradually becoming smaller and smaller, and, fortunately, in some sections is now almost an unknown quantity. When each class shall have moved one notch forward looking towards increased performance and efficiency, who can estimate the result.

LEGISLATIVE CONTROL OF FEEDING-STUFFS.

By W. P. Gamble, O. A. C., Guelph.

Attention has repeatedly been called to the desirability of some official system of inspection and analysis of concentrated feeding stuffs as sold in the Dominion of Canada and which will further necessitate the manufacturer or vendor of these products to attach to each package or parcel a tag bearing a guarantee of the percentages of protein and fat contained in the feed, or, if sold in bulk, to produce on demand a guarantee of the percentages of the two constituents mentioned. Such a plan has long been in force with regard to the essential constituents of plant food in commercial fertilizers, and the ever-increasing number of milling by-products now offered for sale renders it equally important that a similar plan be adopted for them. This matter was discussed at some length by this Union upon three former occasions, and is here again brought forward because recent analyses ordered by the Dominion Government have furnished an excellent illustration of the force of this contention.

In the early part of 1905, recommendations read at the last annual meeting of this Association were forwarded to the Government. These recommendations have been acted upon in full and the information is now to hand in Bulletin No. 116, Laboratory of the Inland Revenue Department, Ottawa.

It is not necessary to enter into any detailed discussion of these results in order to make good the point under consideration. A casual review of them, with reference to the percentages of protein and fat, will suffice to assure those informed on the subject that in most instances the feeding values and prices of these feeds are not in accord. In fact, at the present time feed is retailed at so much per ton whether it is rich in protein and well suited to supplement our ordinary farm feeds, or whether it is a starchy feed, and, therefore, of much less value in compounding suitable rations for cattle. Such being the case, special care in the purchase of feeds and some knowledge of their chemical composition will be found of great value in selecting the feeds that will produce the greatest profit. Economical purchase, however, does not imply the purchase of the lowest priced feeds. Many of the waste products of our mills are not altogether worthless, but it is important that the purchasers should know what they are and what relation they bear to standard feeds such as bran, shorts, etc.

In view of these facts, and in view of the further fact that the committee appointed to deal with this does not deem it practicable to establish limits of variation, I beg to offer the following resolution:

"Whereas on three previous occasions the subject of commercial feeding stuffs has been before this Association, and two separate petitions have been presented to the Government asking that some means be devised whereby the purchasers of mill by-products might be able to judge of their nutritive value; and whereas the Government has complied with these requests in so far as to order a collection and analysis of most of the by-products of the mill; and whereas the analyses show that the composition of wheat bran, shorts, or whole grains, or meal obtained by grinding any single grain, is fairly constant, but that the composition of other commercial feeds varies widely; and whereas bran and shorts constitute the sole output in the way of by-products of many small mill owners throughout the country, and there being no purpose to be served in requiring these men either to employ a chemist or to have analyses made of these by-products of constant composition; and whereas the adulteration of these by-products is fully covered by the Adulteration Foods Act, R.S.O., Chapters 24 and 25; and whereas the committee do not deem it practicable to establish standards or limits of variation for by-products, therefore be it resolved: (1) That the terms 'bran,' 'shorts,' or 'middlings,' when used without further description, shall be construed to mean by-products derived solely from wheat in the ordinary processes of milling, and the products so described shall be free from oat hulls, barley hulls, buckwheat hulls, ground weed seeds, or other substances not derived directly from wheat in the process of milling, and that feeding stuffs containing products not derived from wheat in the process of milling and sold under the name of 'bran,' 'shorts,' or 'middlings,' without further qualification or description, shall be regarded as adulterated feeds; (2) that other milling by-products which are not derived from wheat, but which may be properly described as 'bran,' 'shorts,' or 'middlings' shall not be offered for sale without prefixing the name of the grain from which they were derived to the terms 'bran,' 'shorts,' or 'middlings,' such as, for example corn bran, pea bran, buckwheat bran, buckwheat shorts, buckwheat middlings, etc.; (3) that it is not advisable to require any formula for the composition of wheat bran, shorts, the whole grains, or meal obtained by grinding any single grain; (4) that in the case of other feeding stuffs, each manufacturer or vendor should be required to label each bag or package with the percentage of protein and fat, or, if sold in bulk, that the manufacturer or vendor shall be compelled, on demand, to give a written guarantee of the percentage of protein and fat; and further, if the product offered for sale as a concentrated feeding stuff is a mixture, containing weed seeds, milling by-products, or any by-product derived from the manufacture of starch, cereal foods, split peas, or other manufactured products, the manufacturer or vendor shall be required to furnish a statement showing the kinds of by-products contained in the mixture, and the percentage, by weight, of each by-product in the mixture; (5) that the Government be urged in the interests of feeders of live stock to take such action as indicated in (4); (6) that a copy of this resolution be submitted at Farmers' Institute meetings for the signatures of members, and when these signatures are secured this resolution be construed, as a petition to the Government for the action outlined in No. (4); (7) that a copy of this resolution be forwarded to the Minister of Inland Revenue forthwith, and that the signatures be forwarded as soon as obtained."

After some discussion this resolution was duly moved and seconded, and was carried unanimously by the meeting.

RESOLUTION BROUGHT FORWARD BY MR. W. J. BROWN.

As we have no Alumni Association, it is sometimes necessary to use the Experimental Union for that purpose. We have now quite a large number of college and university graduates who have been admitted to the degree of Bachelor of the Science of Agriculture. A few years ago Dr. Mills asked me to look into the matter of a gown and hood for those of our number who had secured the B. S. A. degree. This I did, and I understand that not long ago the University Senate approved of the recommendation. Anyone holding a B. S. A. degree from the University of Toronto is now entitled to wear the regular "B. A. cap and gown," with a cardinal hood trimmed with white fur. As graduates in Agricultural Science we are looking forward to the degree of Ph. D. It is proposed, however, as an intermediate step to formulate some plan so that graduates of at least three years' standing may be able to take the degree of Master of the Science of Agriculture. This will apply to those who already have the degree. As to the future, our object is, of course, to stimulate graduates to continue their studies. I therefore move the following:

"With a view of encouraging post-graduate and research work in Agricultural Science, and to recognizing work already done, be it resolved that a committee of three graduates of the University of Toronto holding the degree in Agricultural Science be named by the Chair to confer with the Agricultural representatives of the University Senate regarding the drafting of regulations, etc., under which a Master's degree in Agriculture may be granted to graduates for research work and otherwise to those of not less than three years' standing."

This resolution was seconded by Prof. H. L. Hutt and carried by the meeting, and the chairman appointed a committee consisting of Messrs. E. C. Drury, W. J. Brown, and Prof. G. E. Day, to take charge of the matter.

PROGRESS OF THE O. A. C. DURING 1906.

By President G. C. Creelman, President O. A. C., Guelph.

It would not be right that an event of this kind should pass over without something being said of the changes which have taken place during the past year, to show you how the institution has grown, and how, without any desire on the part of anybody to make a change, by simple methods of promotion and tempting offers from other places, the staff of an institution of this kind is depleted during the year.

I must first refer to one who came to us for a short time, Prof. Franklin Sherman. He came to us from North Carolina, and remained nine months as Professor of Entomology and Zoology, but was called back to his old home at an increase of $700. In losing Prof. Sherman we gained the Rev. Dr. Bethune, and his kindly face and disposition has already made for him in the hearts of the students and faculty an enduring place. We thought last year we had lost Prof. Lochhead, but he came back to us for a short time, and has now gone finally to his new work at St. Anne's. At this time it was thought best to divide the Department of Biology into two branches. Dr. Bethune has charge of Entomology and Zoology, and Mr. S. B. McCready is Professor of Botany. Mr. Thompstone and Mr. Jackson, Demonstrators in Botany, left us to go to very lucrative positions, each of them worth $2,000 a year, one in New Zealand, and the other in far off

India. We are fortunate in securing for their places Mr. J. W. Eastham, of the University of Edinboro', and Mr. J. E. Howitt, one of our own graduates, who has recently distinguished himself at Cornell University. We are glad to welcome Mr. Howitt, not only for his own worth, but because he is the only graduate of this College from the city of Guelph, and so we have one of our own boys back in the person of Mr. Howitt. Mr. F. H. Reed resigned during the year, and was succeeded, as Resident Master, by Mr. D. H. Jones. In the department of Chemistry, Mr. E. G. de Coriolis resigned as Demonstrator to accept a splendid position in sugar work in Cuba. His place was filled by the promotion of Mr. H. L. Fulmer, and Mr. G. G. White, of the graduating class of 1906, was appointed to succeed Mr. Fulmer as Demonstrator. In Macdonald Institute, Miss M. I. Speller resigned last September, and her place has been filled by the appointment of Miss Greist, of Pratt Institute of Technology, New York. We have added to our staff also during the past twelve months three persons, Mr. McMeans, a vegetable expert, in the Horticultural Department, Mr. C. C. Thom has been added to the Department of Physics, and Miss Helen Bigelow at Macdonald Institute in charge of the instruction in laundry work. I just ran over these to show you the changes of the year, and showing, I hope, substantial growth. In referring to the work generally, I would like to say that all the departments have been doing the most commendable work. There have been changes in one or two of them. I would like to call attention at this time to the department of English. In consultation with Prof. Reynolds last year he informed me that the department of English should be separated from the department of Physics, and more time should be given to the study of English Literature than had been given in the past; and hence Prof. Reynolds, although loth to give up the work in Physics, consented to release that work and take up the work of English, and devote himself entirely to it. We have thus for the first time this year, a distinct department of English. He was more willing to give up the department of Physics on account of it falling back on the shoulders of Mr. W. H. Day, Lecturer in the department; and so I am pleased to say the department of Physics has not had to suffer as if a new man were appointed who did not understand the work of the College and of the department.

At this point I must refer to something which has been, I am sure, in the minds of each one of you during the past week. I refer to the winning by a class of our College boys, of the trophy for judging cattle, sheep and swine at the International Exposition at Chicago. The boys did magnificently. I feel also that I should say a word about their training by Prof. G. E. Day, Dr. Hugo Reed, and Mr. H. S. Arkell, and I want to commend them in this public way for their persistence in not giving up after winning the prize last year. I had a letter from Dr. Mills to-day in which he says: "We are cheering for you down at Ottawa, but I must say we hardly expected it a second time. Please carry to the boys and to their instructors my sincerest sense of appreciation of their success."

Another point I must mention is the Experimental Union without Mr. Zavitz. If anybody had said to me that such a thing would be possible I would hardly have believed it. Mr. Zavitz has been heart and soul of this organization from its inception, and it does seem impossible that it should have been such a great success without him, but it has been a great success. Everyone who has come to my house to-day and yesterday says that the Union has gone right along with a full swing. I want to thank personally now in the presence of the students, Mr. John Buchanan for the way he has handled this work during the absence of Prof. Zavitz. (Applause.)

We have been honored more this year by distinguished visitors than in probably any other one year in the history of the Institution. They seem to have gotten into the convention habit, and different Associations have been vieing with one another to hold their convention here. The Governor-General has been here twice since we last met. His first visit was just one year ago. He wrote to the old land such a splendid report of it that his daughter insisted that he should bring her up here at a later date. They came again in May. We also had the Canadian Press Association. They adjourned from their meeting in the city of Toronto last spring and came up here and spent the entire day at the O. A. C. The Ontario Teachers' Association spent one day at Easter time, and six other Teachers' Conventions came to us during the year; as well as the Canadian Horticultural Society, composed of the florists of the Dominion, in the month of August.

I should not resume my seat without a word about Macdonald Institute. There may have gone abroad an idea in connection with Macdonald Institute that it is training school for public school teachers of Domestic Science. That is quite true, but that was not the object of the building of Macdonald Institute and the erecting of Macdonald Hall, although one of them; but rather that the girls and women of the Province of Ontario who cared to do so could come to this Institution, and here learn such things as would enable them to become better homemakers. When we selected the staff to teach girls just those things, we added others who would take up the academic side of it, as we thought we could very well train teachers under the same roof. But I want it to be distinctly understood that Macdonald Institute was founded in order that farmers' daughters, and others in the Province of Ontario, could get such an education as they were not able to get elsewhere. The larger portion of those in attendance at Macdonald Institute are here to make of themselves better homemakers than they could otherwise become. The total attendance at Macdonald Institute since its beginning, up to the present time, is 488 young ladies. Of these, 82 were admitted on matriculation standing for the purpose of preparing to teach Domestic Science in the public schools, and 352 have attended for the sole purpose of improving themselves in the art of homemaking.

With regard to the students in attendance at the College during the year 1906, I may say that in the General Course, there are 314; the specialists in the General Course work number 16; Dairy Course during this year, 74; Short Course in Stock and Seed Judging, 235; Short Course in Poultry Raising, 28; making the total students in Agriculture, 667. At Macdonald Institute there are in Domestic Science, 218; in Nature Study, 71; and in Manual Training, 11; making 300 in all, or a total of 967, and with the one who came in to-day from South Africa, 968 students in attendance at the O. A. C. during the year 1906.

PRESENTATION OF THE DRYDEN PORTRAIT.

Mr. W. J. Brown, in presenting to the College a portrait of Hon. John Dryden, made the following remarks: My purpose in addressing you at present is two fold: to pay a deserving tribute to a public man who is still in our midst, and who has given the best years of his life to the service of his country in developing its greatest industry, agriculture; and to add one more mark of esteem to our Alma Mater by decorating her walls with an example of the highest type of Canadian art.

An opportunity to publicly honor a benefactor does not often come within the grasp of college alumni. Fortunately we are not alone in our desire to make the most of this occasion, as the members of the College staff and prominent agriculturists in all parts of Ontario have readily signified their interest and generously co-operated with us in this enterprise. This College, which stands in the foremost rank among educational institutions devoted to agriculture, belongs in a special sense to its students and ex-students who have been privileged to reside within its halls and gather instruction and inspiration from its associations and its professors. Our debt of gratitude can never be fully repaid. We can, however, be loyal to the traditions of our Alma Mater, and can reflect her glory by spreading her influence abroad. We have welcomed this opportunity to add something of value and beauty to her possessions especially as it not only enriches the College, but is at the same time a fitting recognition of public service.

The Hon. John Dryden became a member of the Executive Council of the Legislative Assembly of Ontario as Minister of Agriculture in 1890, and continued in this capacity until 1905. Those were fifteen eventful years in our history. It would take too long to describe the farming conditions of this Province as they were in 1890. The stagnation, depression and "hard times" that prevailed in those days are now merely matters of tradition, and the recollection of them is happily fading from our memories. Mr. Dryden was a breeder of pure-bred cattle and a practical farmer during all the years of his official leadership of Ontario agriculture. When he took the office it was with deep sense of his responsibilities, and a full realization of the needs and difficulties of the practical farmer. He became immediately a working Minister who originated comprehensive and far-reaching schemes that resulted beneficially to the whole country, because Mr. Dryden had his fingers on the agricultural pulse of this Province. It would not be right to give one man credit for the work of the many, but it is only fair to say that by his ability, foresight, able leadership and happy choice of assistants, Mr. Dryden was largely instrumental in bringing about many remarkable changes and effecting numerous improvements in the methods of farming in Ontario. He was a Farmers' Institute lecturer for some years before he became Minister of Agriculture, and he took a special interest in the development of the Farmers' and Women's Institute systems, which reach and help the average farmer under local conditions to improve his methods of farm practice, and the ordinary isolated farm home to catch the spirit of progress with the enlightenment and culture that inevitably follow in the trail of awakened intelligence. His efforts in behalf of the Guelph Winter Fair, and his success in securing the permanent establishment of that institution in this city are well known to you all. The Winter Fair and Fat Stock Show is a triumph of Ontario Agriculture. It merits and receives widespread recognition and support, and is being imitated already at Ottawa, and at Amherst, Nova Scotia, as well as in other parts of Canada. What he has done for the great dairy industry of this Province will never be realized nor fully appreciated. He was always an enthusiast in behalf of improved live stock, and has exerted a powerful influence in developing this the greatest of our agricultural industries. The betterment of our flocks and herds has been with him almost a passion. In 1901 he said he hoped to live long enough to see the day when all the "scrub" stock would be removed. He encouraged, assisted, and promoted by every means at his command, fruit growing, poultry raising, beekeeping and kindred interests, and enabled them to attain their present high state of efficiency. His greatest work, however, was in behalf of scientific and practical agricultural education. Aside from his duties as an administrator this was his chief concern. This College and Experimental Farm were his instruments, the numerous organizations, publications, etc., of his Department were his avenues for the dissemination of knowledge, while the farming communities of this vast Province comprised his field. It has been our privilege to witness many gratifying results of this mighty work. For example, this College from small beginnings and inadequate buildings, has become one of the greatest of its kind, a revolution in farming methods has taken place, farm values have increased, the revenues from farm products have doubled, social life in rural communities is immeasurably more attractive than heretofore, while the sunlight of agricultural science has illuminated the whole land. But the fruition of Mr. Dryden's plans is not yet completed; each year will widen their scope and each decade multiply their benefits. Truly he has been among our leading public benefactors and well deserves the thanks of a grateful people.

Mr. Dryden's pre-eminence as a practical Canadian agriculturist has been recognized by the Government of the motherland. During the present year it has been his privilege as a Royal Commissioner, to investigate agricultural conditions in Ireland. This is the first time in our history that an honor of this character has been bestowed upon a Canadian. It is another act in recognition of our place in the sisterhood of nations forming the corner stones of Empire.

The most striking personal characteristics of Mr. Dryden are his modesty, fairness, and loyalty to the highest ideals of public service, while his administration was conspicuous for its strength, perseverance, wisdom, and moderation. He was the chosen representative of a great political party, and accepted and discharged his trust as such, yet in his estimation the interests of the whole people, in a country in which agriculture is supreme, were greater than those of the Party; therefore, in the conduct of his Department he was non-political. His successor seems to be taking the same enlightened view of his duties and his opportunities.

The many generations of students that have passed through these halls have felt the impress of Mr. Dryden's personality. His dignity, gentle manners, integrity, and enthusiasm have been a source of inspiration to hundreds of young men who are to-day "pushing to the front" in this and other lands. I now have the honor to present to the Ontario Agricultural College this portrait in oil of the Hon. John Dryden, painted by E. Wyly Grier, R.C.A. This is an expression of our appreciation of Mr. Dryden's personal worth and splendid service to this country. (Applause.)

Hon. Nelson Monteith: It is my pleasant task, on behalf of the College and on behalf of the Government, to accept at the hands of the ex-students and other agriculturists this splendid portrait of the Hon. John Dryden. I trust that as it hangs upon the walls of this Institution it may be an inspiration to the young men, as years go by, and stimulate them to greatest efforts in all walks of citizenship. I desire to echo, in part, the remarks that have been made by Mr. Brown. To-night we are paying a tribute to a man who is still alive to partake of the honour. It is generally looked upon as a human frailty to say a great many good things about a man after he is dead, especially a man who has been engaged in politics, but this is a notable exception; and I trust that as years go by it will be a privilege that you will feel in duty bound to perform to public men who are still in active work, who have done public service and good service.

This presentation is somewhat of a pleasant variation from what is usual on such occasions. It is needless for me to say much about the work that Mr. Dryden has performed while occupying the position of Minister of Agriculture. The memorial of his work is largely evidenced in the increased comfort seen in the homes of the agriculturists throughout the length and breadth of this great Province. I believe it is through his influence to a large extent that a higher standard of living has been set up. That, I believe, in itself, is one of the highest tributes we can pay to the Hon. John Dryden. It has been his singular good fortune to have been the agent to bring that condition of things about, but remember that this great work is not yet fully accomplished. I look to the young men, to the student body, to go out among them and still further raise the ideal of life upon the farm. I believe you are the leaven that is able to do it; but remember you have a great task before you. It is an inspiration to look around on the splendid student body we have here to-day, and feel that they are being imbued from day to day with higher ideals as citizens of this Province. We have a great Province—a Province whose resources as yet are but simply touched on the surface. We have a Province of boundless possibilities, and though there are a great many people who are prone to speak of the west as the Eldorado to which young men should turn their faces, I believe there is a greater and grander future for the young men who stay right here and take an active part in the duties of citizenship. My wish is that they may rise to positions of honor and trust, and that they may fill these positions as well and as honorably as the position of Minister of Agriculture has been filled by the Hon. John Dryden.

Hon. JOHN DRYDEN, in responding, said: This is one of the occasions on which a man can be very happy and yet very much embarrassed. That seems to be my position. I feel a little different from what I have ever felt before, when I have undertaken to talk to students and ex-students on occasions like this. The matters are a little too personal, and it breaks one up.

Before I go further, may I be allowed to say a word for the artist who has done the work you are now looking upon? I happen to know something of the effort which has been put forth by him, and it appears to me that he has not only made an excellent likeness, but rather improved on the original. Of course that is why I like it so well, but if you had seen, as I saw—because I was there—the energy, the determination, the enthusiasm, which the artist put into his work, I am sure you would appreciate it possibly more than you do now. I think he deserves great credit, and I want to say a good word for him, although he is here.

I suppose the real occasion of this splendid gift, so far as I am concerned, and the honor which has been done me, is because of the effort which I was permitted to put forth during the years of my occupancy of the Department of Agriculture for the advancement of practical agriculture in this country. Now, the action of the student body has brought to my mind very forcibly two words, and these words are quite the opposite one of the other. The first one I do not like to mention; it always sounds bad to me, and the word is "Forgotten." How soon a public man is forgotten! People have not time to look back and think about the men who used to be; they are thinking of the men who present themselves before them just now. And so it must happen that, little by little, as the days and years roll by, the men who were in action a few years ago are forgotten. What I like about it is that so far as this institution is concerned, and so far as my work in connection with agriculture is concerned, the students and ex-students have made it impossible that John Dryden should be forgotten. They have wiped out that word altogether, and have written another and a much better one in its place, that is, "Remembered," and it brings joy to everybody's heart to know that they are in the memory of their friends. So in the future, as people come to see this portrait and enquire who it is, the name and the work must, I think, always be associated together.

This occasion carries me back to the years gone by. To-day I was out on the campus, and I was trying to see the campus as it was when, about seventeen years ago, I took possession of the Department of Agriculture and began to interest myself somewhat vigorously in this particular institution. It was not the same then as it is now. Perhaps the main College building itself looks somewhat similar, but it has been greatly improved since then. In that building you had the dormitories and dining room, and it contained a museum, or what there was of a museum, and library and class rooms. The only other building we had here was a one-story building where the present chemical building is. Unfortunately that building was destroyed by fire, but it was rebuilt during my time. There was no gymnasium. I do not know what the boys would do without a gymnasium now, but you will never know what kind of a fight I had to get one for you—a fight inside the Cabinet and a fight outside— and yet we quietly stuck to the job and won the day. Then there was no experimental building; neither was there any stock judging pavilion, and I had to fight like a Trojan to get that. My colleagues did not understand the use of it; they could not understand, as I did, the need of it; and yet it is one of the most useful buildings we have here. Of course in those days there was no poultry department and no Dairy School. We thought we would make provision out of the old Dairy Building which stood there when I first took office for a Dairy School which would accommodate fifty students, and when we opened our doors one hundred men presented themselves. As there was onlv room for fifty you may understand what happened. I went to my colleagues and said: "I must have another building. I want you to give me money to put up a regular Dairy Building, with all the appliances necessary." Everybody knows I was right. All this came back to me when I stood out on the campus to-day, and thought of the beginning of things some sixteen or seventeen years ago. We had one department after another brought into use. The Horticultural Department—does anybody here remember it as I saw it in those days? It was in a building that looked like an old root house. I had to put my head down to keep from striking the roof as I walked through it. It was a very good root house, but that is about all. We said we wanted a proper building, and we got it by and by. I am glad I did all this, and I am glad I had the courage to stand up against these men who did not have correct information about what was needed. To-day there is nobody fighting Mr. Monteith on any subject; and if he ever gets into trouble along that line I ask him to send for me, and I will try to help him.

However, it is not in these College buildings that the College lives as a vital force in this country, but it is in the student body; and if the College fails to inspire these young men and to give them a new zeal to fit them for the best service and point them to higher things than agricultural production, I must say they have missed the opportunity which is afforded by this splendid equipment we have here.

I noticed that Mr. Brown in his address suggested that all the credit of what this College has accomplished ought not to be given to your humble servant. I want to emphasize that statement. Why, Mr. President, what could I have done here without Dr. Mills? Where would have been all my energies? I could not have accomplished anything along these lines if I had not had a man here to carry out the letter of what was proposed; to spend his days and hours scheming all these things and making everything go harmoniously. I want to say that we have not yet begun to appreciate Dr. Mills at his true value. He put his best life and best days into this institution. He was a true and scholarly gentleman at all times, and the boys know it. He was sometimes a little severe in his discipline, but he loved every one of you all the same, and there is not a boy here who knew him who does not allow that that was the case. He would do anything then to help you if you were in trouble, and he would do anything to-day. He was a man of great force and untiring energy; he was a man of great reserve, and when he was foiled and could not get what he wanted in one way he would try another way. He wanted these buildings that are going up here now, but if he had stayed here he would have shown you what a resourceful man he was. No one knows of how much value Dr. Mills was to me in this work. Perhaps I ought to say that we were the complements of each other. I could not have accomplished the work without Dr. Mills. I do not know whether Dr. Mills could have accomplished it without me, but at all events he did not do it before.

Then there were others. I don't like to mention names, in case I should miss some, but what could I do teaching agriculture in this College without Prof Day? I spotted him; Dr. Mills spotted him. We had in our mind what would be done, and we took him as a raw recruit out of the student body, and he has proven his worth. You heard Mr. Ross talk about the Experimental Union growing; there is a man who is growing; Prof. Day is a stronger man to-day than he was five years ago. Prof. Dean is another taken out of the student body at that time; he has made his mark all over the country in his particular line. Then followed Reynolds, Harrison, Graham, Reed, Hutt, Harcourt. If I was able to do anything, it was by the work accomplished through these men. I must not forget to mention Zavitz, that enthusiastic experimenter. What would the College do without him (Applause.) Mr. Zavitz's department has advertised the College year after year, and I was very glad to push him along as fast as I could in any direction in which he sought to go.

There is one other thing I would like to touch upon, and that is the reference which Mr. Brown made to the personal influence I was able to exert upon the students as they passed through this College. Now, to have touched the lives of these young men for good, to have given them any inspiration, to have presented to them nobler aims than they had before, I think is by far the greatest achievement that I could imagine concerning myself. The erection of these buildings is nothing in comparison with that. Nobody knows when two or three of these young men are lifted up to a higher plane how far the influence is going to extend. The influencing of these young men going out into the world's work, I say, is vastly more important than any other part of the work that has been accomplished.

A word as to the future. What of the future of this institution? Well, it depends, I suppose, on how well the equipment which is now provided is used. It does not depend on formalities merely; it does not depend on best records. I was proud as a Canadian when I heard a young man tell what had been accomplished, but it does not depend on the prizes which have come from the east or the west, or from anywhere. It depends upon the uplifting influence on the students who come to take a course here; it depends on the inner life; it depends on the soul life of the institution. It is life we are touching here; it is character we are seeking to form here—solid, good character, which will tell on the general character of our Canadian people as the years go by. Men in my position see so much of wasted life, so many might-have-beens, so many human wrecks. It seems worth while for a man to prevent them so far as possible; and so I say here is a great opportunity in that respect where we are dealing with life from day to day and year to year.

Speaking of the future, I want to say our country needs—more than she ever needed before, perhaps—earnest, loyal men, well equipped workers; not drones, not slaves merely, but independnt, energetic workers. We want an aggressive, sturdy lot of men going out of this place, because this is the one place, and the best place, I know of in Canada at present to produce them. And I want to say to you young men who are listening to me that I do not want you all to go west. By and by we will have an influx back again; mark my words. They are going out there for the dollars. Do not let that be the highest ambition of your life. I do not object to you getting as much money as you can; I don't want to hinder you in the slightest degree, but we need you in old Ontario to-day, and we shall need you more. There is much to be done; there are leaders wanted. If I were twenty-five years younger I should like to throw all my ability into the work which I see needs to be done here in Ontario. I have been all over Ireland; I have mingled among her people, and I want to tell you that before you know where you are Ireland will get right ahead of you, because they are working along these lines, and an effort is being made to teach them to co-operate to help one another. It is slow work there, but it is work that needs to be done.

There is plenty of money in agriculture, but the farmer does not get it; it is divided up because there is such a tremendous gulf between the producer and the consumer. I myself am a producer down in the County of Ontario, and a consumer in the City of Toronto. Somebody is in between the producer and the consumer. The producer does not get by a long way what the consúmer has to pay. He does not get his share. There is not the same kind of organization and co-operation which will bring the two classes nearer together. I do not want to see, so far as I am concerned, the gulf growing wider than is necessary.

I want to say one word, and then I will finish. My sympathy, whether I am in the Government or out of it, is with the man who is living on the soil, and I would do anything I could for him. During my time here I did try to help these men, and the influence I could exert was brought to bear for them on every occasion. It is worth while, whatever your station or position, to help these men living on the soil, and I am glad that this institution, which had my care for so many years, is doing what it can to supply the men that are needed. In conclusion, I wish to offer my most hearty thanks to the students, ex-students, and others who have so nicely expressed their appreciation of my services to Ontario by the presentation of this splendid portrait.

ANNUAL REPORTS

OF THE

Dairymen's Associations

OF THE

PROVINCE OF ONTARIO

1906

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE.)

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1907

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TORONTO.

To the Honourable WILLIAM MORTIMER CLARK, K.C.,
Lieutenant-Governor of the Province of Ontario:

MAY IT PLEASE YOUR HONOUR:

I have the pleasure to present herewith for the consideration of your Honour the Report of The Dairymen's Association of Eastern Ontario for 1906; and the Report of the Dairymen's Association of Western Ontario for 1906.

Respectfully submitted,

NELSON MONTEITH,
Minister of Agriculture.

TORONTO, 1907.

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OFFICERS FOR 1907.

EASTERN DAIRYMEN'S ASSOCIATION.

President	J. R. Dargavel, M.P.P.	Elgin.
1st Vice-President	Henry Glendenning	Manilla.
2nd Vice-President	Levi Patton	Brockville.
Secretary	R. G. Murphy	Brockville.
Treasurer	James R. Anderson	Mountain View.

Auditors: Morden Bird, Stirling; F. Brenton, Belleville.

Directors:

John H. Singleton, Smith's Falls.
Neil Fraser, Vankleek Hill.
Edward Kidd, North Gower.
J. D. McPhail, Russell.
John McGregor, Alexandria.
Angus Grant, Moose Creek.
C. F. Whittaker, North Williamsburg.
Levi Patton, Brockville.
G. W. Carson, Charleville.
John R. Dargavel, M.P.P., Elgin.
D. Derbyshire, M.P., Brockville.
T. A. Thompson, Almonte.
William Guthrie, Perth Road.
Robert Merzler, Odessa.
James Whitton, Wellman's Corners.
T. B. Carlaw, Warkworth.
G. A. Gillespie, Peterborough.
Henry Glendenning, Manilla.
D. H. Young, Melville.
G. G. Publow, Kingston.

WESTERN DAIRYMEN'S ASSOCIATION.

President	Jno. McQuaker	Owen Sound.
1st Vice-President	Jno. Brodie	Mapleton.
2nd Vice-President	J. J. Parsons	Jarvis.
3rd Vice-President	Jno. H. Scott	Exeter.
Secretary-Treasurer	Frank Herns	London.

Directors:

Thos. Ballantyne, Jr., Stratford.
J. N. Paget, Canboro.
D. A. Dempsey, Stratford.
W. Waddell, Strathroy.
Geo. A. Boyes, Putnam.
Samuel Wallace, Burgessville.
J. B. Smith, Alton.

FINANCIAL STATEMENTS.

DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.

RECEIPTS.		EXPENDITURES.	
Balance on hand from 1905	$652 55	Convention or regular meetings	$481 30
Members' fees	290 00	Officers' salaries	374 00
Donations	485 00	Directors' expenses	474 75
Legislative grant	2,000 00	**Postage and stationery**	75 00
Advertising	165 00	Printing and advertising	155 45
		Lecturers' expenses	28 25
		Inspectors' expenses	31 53
		Reporting	35 00
		Rental Opera House, Peterboro	150 00
		Local Committee	49 35
		Music at Convention	37 00
		Stock in Canadian Dairyman	245 00
		Interest, express and caretaker	13 35
		Balance on hand	1,442 57
Total	$3,592 55	Total	$3,592 55

DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

RECEIPTS.		EXPENDITURE.	
Cash on hand	$718 07	Prizes	$390 00
Members' fees	352 00	Expenses for convention	167 60
Donations	26 50	Officers' salaries	182 00
Legislative grant	2,000 00	Directors' fees and expenses	221 80
Sale of exhibits	2,597 27	Postage, printing and advertising	246 98
Advertising in programme	160 00	Judges' expenses	52 80
		Lecturers' expenses	15 45
		Auditors	9 65
		Periodical for members	179 00
		Reporting	70 00
		Purchase of exhibits	2,776 60
		Office light and cleaning	24 57
		Office furniture	14 95
		Office rent	119 60
		Stock Dairyman Pub. Co	100 00
		Telegraph and telephone	65 11
		Express and cold storage	34 61
		Supplies for buttermaking contest	62 69
		Balance on hand	1,120 43
Total	$5,853 84	Total	$5,853 84

Dairymen's Association of Eastern Ontario.

ANNUAL MEETING.

The thirtieth annual meeting of the Dairymen's Association of Eastern Ontario was held in St. Patrick's Hall, in the City of Ottawa, on the 9th, 10th and 11th of January, 1907.

The great feature of this Convention was the enthusiasm of everybody connected with dairying in Eastern Ontario. Prices were good, the business was never better than at the present time, Canadian cheese has been increasing in demand in the British market, the Sanitary Inspectors and Instructors have had the effect of making most of the factories thoroughly clean and up to date, and it can be said of Canadian cheese that it is pure, clean and wholesome.

Mr. J. A. Ruddick, Dominion Dairy Commissioner, occupied the chair at the opening meeting. Among other things he said: I am very glad, as a representative of the Department of Agriculture, to welcome the farmers to the city of Ottawa. I think it is a splendid place to hold a convention, and I know from experience in this locality that you will be able to get a good meeting of farmers to discuss questions in which they are interested. I have been at a good many of these conventions for the last 25 years. I have attended every one when I was in Canada. I will not take up your time, but will call upon the President to deliver his annual address. (Applause.)

PRESIDENT'S ADDRESS.

By D. Derbyshire, M.P., Brockville.

It is a great pleasure to have Mr. Ruddick in the chair, as he has always taken such a deep interest in everything pertaining to the work of dairymen in the past, and has been co-operating and rendering us valuable assistance.

It is also a pleasure to meet in the capital city of the Dominion, and especially so when we see the wonderful development the people of this section have made since we last met here. You have more than doubled your output of butter, cheese, and bacon, which plainly demonstrates to us that you appreciated and put into effect some of the truths brought out at our last meeting here, and we hope that this meeting will be of even more importance to you.

I desire, on behalf of the Directors of the Association, to thank you for the very cordial reception extended to us. We feel under special obligations to your local committee who rendered our secretary, Mr. Murphy, such valuable assistance in making preliminary arrangements for this meeting. We wish to thank your city council, your county council, your banks and business men for their generous aid financially, in bearing some of the expenses incident to the holding of a meeting of this kind.

We are pleased with the enterprise of your citizens, your magnificent buildings, churches and schools, all of which are of the very best, not forgetting our Parliament buildings, which, for location, style of architecture and beauty, are not excelled on the continent. You have the finest of water powers, fine railway facilities, and everything to make a great commercial city. As you are in the centre of a great agricultural district, there is nothing can impede your progress.

The dairymen of Eastern Ontario are pleased that His Excellency Earl Grey has consented to open this convention, thus identifying himself with the dairymen, and thus causing us to feel that we have his sympathy in the great work we have in hand in educating the people to place larger quantities and better qualities of dairy products upon the English market.

With reference to the output of our dairy industry, we have to acknowledge that we did not produce quite so much milk as in 1905, owing to the shortage of pastures, and we feel confident that with all the educational advantages that are in reach of our dairymen—such as this Association, the dairy schools, agricultural colleges, and cow-testing associations—a greater quantity should have been produced. We believe that the cow-testing Associations which are being encouraged and established under the supervision of our Dairy Commissioner, should receive more attention from the dairymen, and that nothing would have aided more in keeping up the quantity and standard of quality than the accurate knowledge of just what our individual animals are doing, which is easily obtained by the information of these cow-testing associations.

We find that we made about 100,000 more cheese this year than last, yet we find that we are behind in the exports of butter about 180,000 packages. However, with the high prices obtained, we find that the estimated value of cheese, butter, and bacon exported will amount to about $46,500,000 from the make of 1906, and when you add to this $54,500,000—the value of these articles of food (including milk) consumed at home—we have a grand total of $101,000,000, which is $6,000,000 more than for the year 1905, and as our dairymen become better educated in the work, we expect to see the demand for both foreign and home consumption increase each succeeding year.

Under the direction of the Hon. Nelson Monteith, Minister of Agriculture for Ontario, we have had twenty-eight instructors and two sanitary inspectors for the year 1906 just closed, and we expect our staff to be increased for the next year, and each instructor made a sanitary inspector. We have also had the services of our Chief Instructor, G. G. Publow, whose untiring energies and marked ability have always been at the disposal of this Association.

Our Dairy Commissioner for the Dominion has also been of great assistance to the dairy industry in many ways, and his work in the line of better transportation and refrigeration has been much appreciated. He has extended the work a great deal this last year by placing more iced cars for transporting dairy products throughout the Dominion, and for the first time a travelling iced car inspector, the results being that the goods were delivered in Montreal in better condition than heretofore. This improvement in transportation has been brought about by the close attention and oversight of Mr. Ruddick. The Surrey Dock Company, of London, have given such splendid satisfaction in handling our goods for the London market that we are hoping the other ports will provide similar facilities.

The supremacy of our dairy products for 1905 is largely due to the additional work of our instructors, under Chief Instructor Publow, and the influence of our cool curing-rooms and improved transportation on our railways and steamships, thus delivering our goods upon the British market in better condition than ever before, and securing for us better prices and a greater demand.

I am proud of the fact that our dairymen have been very prosperous during the year just closed, and I predict a continuation of this prosperity for the coming year; yet I regret that our manufacturers have not shared in that prosperity as in most instances they are paid the same prices only, as formerly. I do hope our dairymen will carefully consider this matter, which is, in my opinion, of vital importance to them, and not allow their old and trusted makers to retire from this business, but encourage them by giving them at least 1¼c. for manufacturing, and urge them to attend our Eastern Dairy School, which is so well equipped to give them a thorough training, and thus enable them to do much better service in the coming year.

With our present opportunities for education and instruction, and with every factory in Eastern Ontario belonging to the syndicate system, with our milk producers joining heartily with the manufacturer, we hope to make 1907 the most prosperous in our history.

I wish to express my appreciation of the honor that has been conferred upon me by selecting me through a series of years as your President, and for the courtesy and kindness shown me by the officers and members of this Association, as well as by the dairymen throughout all of Eastern Ontario, and as I am retiring from the Presidency of this Association, I trust that the same harmony will prevail, and that you will have but one object in view in the years to come: That of raising our standard as well as the quantity of our dairy products in Eastern Ontario.

I have had the pleasure of seeing this industry rise from small proportions to the mammoth position it occupies to-day, and I want to again thank those who have been associated with me in this work for their untiring energy and hearty co-operation. I can heartily testify to their earnestness and ability, and the rapid advancement that has been made in every department of dairying also testifies to their adaptability for the positions they have held.

As your retiring President I would like to have every producer, every maker, every proprietor of a factory join with me in making one supreme effort for improvement all along the line, and have for our watchword for 1907: "Improvement." (Applause.)

Mr. Ruddick: I am sure you all agree with me in saying the President has touched on some very important matters in his annual address. I was particularly interested in one point which he mentioned in respect to the importance of our home market. I hope before the convention is over to have an opportunity of enlarging on that point to some extent. I think you will also agree with me that it was a somewhat momentous hint he made when he told us he intended to retire from the Presidency of this Association. To attend a dairy convention in Eastern Ontario, and not to find Mr. Derbyshire in the chair, would be very strange to most of us, because he has occupied that position so long and so well, and to the satisfaction of the dairymen of Eastern Ontario. (Applause.)

Another subject that is on our programme this morning is the matter of dairy records, which is to be presented by Mr. Whitley, of the Dairy Commissioner's staff. I do not think there is any more important subject to claim the attention of the milk producers of Eastern Ontario or any other part of Canada. I believe that along these lines there is more room for increasing the profits of dairying than along any other, and I hope that our efforts in the direction of creating an interest in this work will continue to meet with success, as they have in the past, and I hope to see a very large extension of the work in the future.

DAIRY RECORDS.

By Chas. F. Whitley, of the Dairy Commissioner's Staff, Ottawa.

The keeping of records of dairy cows may be viewed from two distinct standpoints, that of the professional breeder who wishes to sell pure-bred stock on their certified record of performance, and that of the ordinary dairyman who is selling milk. The former it is not intended to discuss now. The Dairy Commissioner's Branch is paying particular attention to the latter, urging the formaton of cow testing associations.

From a business point of view each dairy cow may be regarded as a separate department of one undertaking. It is an elementary principle of sound business to take means of ascertaining that each department pays, that is, that each single individual cow gives a return large enough to pay for food, labour, etc., etc., and leave a margin of profit. Guessing at the total yield will not avail. Memory is too treacherous. The total production of the milking period must be calculated so as to strike a balance with the total cost of the twelve months' food, etc., and ascertain the margin—if any.

It is believed there are hundreds of cows on our dairy farms to-day that fail to yield an annual profit. This is not creditable. National pride of our reputation as a dairy country should spur all farmers to immediate improvement on the present attainments.

To determine the value of cow to the dairyman three questions must be answered. 1. How much milk does she give? 2. How much fat does that milk contain? 3. What does it cost to produce? Such questions are readily answered if a simple record system is adopted. The members of the cow testing associations organized by the Dairy Commissioner's staff agree to weigh the milk of each cow night and morning every ten days right through the milking period, at the same time taking a sample for testing. The time occupied is not more than about four minutes per cow per month. The composite sample is tested free by the Department every month. This is not experimental work. It is practical, common sense business methods applied to the foundation of successful dairying. Cheap milk is the kernel of all farming economy. Milk is dear and sold at a loss to the dairyman if produced in too small a quantity by any cow. No matter what her pedigree, her breed, or her hold on the affections, she deserves no place in the herd if her production is not adequate. Cheaper production means larger dividends.

The value of cow testing associations has been abundantly proved for years in the older and prominent dairy districts of Europe. Scotland, Norway and Sweden, Denmark, Holland, Switzerland and Germany all have them in successful operation. Records have proved themselves not of temporary but of permanent benefit in assisting to build up profitable dairy herds. They are valuable and indispensable to the progressive dairymen, because (1) they assist in distinguishing the good from the poor cows; (2) they guide the feeder in preparing rations economically; (3) they give warning of approach of sickness, and (4) they give inspiration to those aiming for further improvement.

The following tables are based on the records of 16 cow testing associations in Ontario and Quebec in 1906.

SHRINKAGE IN MILK IN TWO HERDS, NORTH OXFORD, ONT.

Herd A, 15 cows. Average yield.	1906.	Herd B, 15 cows. Average yield.
lbs.		lbs.
1,024	June	831
843	July	865
663	Aug.	606
631	Sep.	703
3,160		3,005
38%	Shrinkage in 4 months.	15%

INDUCE STEADY AND LENGTHY PRODUCTION.

The owner of herd A admits that his cows did not receive as good attention this year as usual, or as much feed. If the shrinkage had been as slight as in the other herd, there would have been 3,840 lbs. more milk from the same cows, or nearly $38.00 more income in September alone. Neglect is costly.

The owner of herd B states: "We were careful to milk at the same time daily, letting nothing interfere. We fed a little oat chop all through the season until the corn was ready. We are generally the first to stable the cows in the fall and the last to turn out in the spring." Even gradual shrinkage is apt to be overlooked, but a record in black and white calls immediate attention to it, crying for soiling crops and better care.

It is not always the cow that starts off in the season with a large flow of milk that is the heaviest producer. The fact that she gave "a couple of pails at a milking nearly all through June" does not mean than she gives 5,000 lbs. during the year. She may decrease much more rapidly than the one in the next stall whose shrinkage in flow is gradual. Estimated totals are almost certain to be in excess of the actual production, and the only safeguard is to weigh regularly. The record should be accurate.

COMPARISON OF TWO HERDS, BROCKVILLE, ONT., 5 MONTHS, MAY TO SEPT.

Herd.	No. of Cows.	Total yield.		Average per cow.		
		Milk.	Fat.	Milk.	Test.	Fat.
		lbs.	lbs.	lbs.	p.c.	lbs.
A	6	30,984	873.1	5,164	2.8	145.3
B	12	32,749	1,039.7	2,729	3.1	86.6

BETTER COWS, LESS WORK, MUCH MORE PROFIT.

The table given is a comparison of two herds at Brockville, Ont., owned by two men of the same name but different methods, and shows in a striking manner what a man loses through not selecting or improving his herd. In the one case, twelve cows had to be fed, milked and looked after for five months to produce but a trifle more milk than the other lot of six cows. The owner of herd B might go along in blissful ignorance of what his cows might and should do unless he had the record of herd A to stimulate him. The knowledge gained from continued records will save farmers from keeping such poor cows. A few good cows will yield greater profit than a large herd of unselected animals.

COMPARATIVE YIELD OF 3 BEST AND 3 POOREST COWS IN A HERD OF 12 GRADES, NORTH OXFORD, ONT.

These cows calved March, 1906, ages 4 to 11. Total production, 7 months, April to October, 1906:

3 best cows, 17,145 lbs. milk, 723 lbs. butter, $159.10; $48.71 more than the other three.

3 poorest cows, 12,997 lbs. milk, 501.8 lbs. butter at 22c., $110.39.
Best cow in herd earns $24.77 more than the poorest in the seven months.

In the above the six cows may be fairly compared. No heifers or farrow cows are included, just six of an ordinary every-day herd. The 3 best cows produced 4,148 lbs. milk more than the 3 poorest in the seven months; or taking the cash value of the two extremes, the best cow earned $24 more than the poorest. In other herds in this association there were similar differences of twenty and twenty-three dollars in the earning power of mature cows. Production is the best of the value of a cow. Each individual in the herd must be known and the poor ones discarded. The only way to know is by the use of the scales, the Babcock test and a little arithmetic.

Individuality is everything. In figuring out the merits of the herd averages will not do at all. Averages are too kind to the poor cows, hiding their shortcomings, while at the same time they are unduly harsh with the best, dragging their good records down.

DIFFERENCE BETWEEN INDIVIDUAL COWS IN THE SAME HERDS, COWANSVILLE, QUE., 1906.

No. of herd.	Time.	Difference between highest and lowest yields.		Age of cow with lowest yield.
		lbs. milk.	lbs. fat.	
4	9 months.	1,165	53.6	8
6	8 "	940	32.1	4
8	8 "	1,520	49.5	13
9	8 "	1,855	60.5	3
10	6 "	1,350	24.0	5
14	6 "	2,010	33.5	8
27	10 "	3,675	41.7	5
32	5 "	1,680	66.8	6

The table emphasizes this point of individuality showing in eight herds in the Cowansville association the differences between the highest and lowest yield of milk and fat.

In herd 6 the best cow in 8 months gave 940 lbs. milk containing 32.1 lbs. fat more than the 4 year old poorest cow. That difference, large enough as it is, is nearly doubled in herd 9, the 3 year old giving 60.5 lbs. fat less than the best cow.

In herd 27 the difference is 3,675 lbs. milk in 10 months, or 367 lbs. milk per month, while in herd 32 the difference is actually 66.6 lbs. of fat in only 5 months. The indications from this association's present season's records are that there is plenty of room for judicious selection. For instance, in one herd a 4 year old cow in 8 months gave 5,330 lbs. milk and 210 lbs. fat, but a 6 year old in 9 months gave only 3,745 lbs. milk and 140 lbs. fat. One month longer opportunity but 70 lbs. less fat. Similar differences occur in other herds. Such contrasts indicate how imperative it is to test for fat, and to weed out the poor cows. The call to-day is for efficiency, economy and quality in the management of dairy herds. The men who have been successful in building up good herds follow the system of recording. The pathway to success is well beaten, and there is good company along this highway of increasing traffic. The system needs no argument for its adoption; it carries its own recommendation. Judicious selection following such a system means that the average production and profits of scores of dairy herds can speedily be doubled.

In the general pooling and handling of herd milk the yield of any one cow is immediately lost sight of. There is no permanent tangible or visible bulk or weight. Poured into the weigh can it mixes instantly and loses its identity in the general total. Being a fluid it is indistinguishable by its shape, size or color, thus is so radically different from other farm products, the fat steer, plump chicken, luscious berries or ripe grain. To be taken at all, the yield of the individual cow must be noted and recorded at the moment of her milking, then at the end of the season intelligent action can be taken in selection. It will thus be seen that the value of records is indisputable, they are easily kept, cost but a trifle and their value increases as they are continuous. Their use must appeal to every thoughtful dairyman as being of immense and immediate benefit. To an honest mind free from bias or preoccupation the plea is unanswerable. (Applause.)

The Chairman: I am sure you will agree with me in the importance of this question which Mr. Whitley has so clearly and so intelligently placed before you. I am only sorry that a larger number of farmers are not present. You heard this morning from the President's address something about the increased total value of our cheese this year, owing to the very high prices which prevailed. I believe it is quite possible in a few years to be applying this method of selection to increase the total value of the production of milk in this country, by at least $30,000,000. You will never see that increase or anything approaching it from the increased value of our product, for that is the end of the business over which the producer has very little control; but he has control over this end of the business, and it is high time, I think, that those who are engaged in the production of milk, should pay more attention to matters over which they have absolute control, and not concern themselves so much with some other things. We have with us, Mr. Grisdale, who deserves a great deal of credit for the preliminary work which he undertook in this connection, and I will ask him to say something at the present time.

Mr. **Grisdale**: This question of dairy records is certainly one which deserves the most careful attention of every dairy farmer. I have been working on these lines for seven or eight years, and the results have been to me almost startling. Mr. Whitley showed you the wonderful difference that might be found among individuals in the same herd, and it is in becoming acquainted with the individuals that we are able to increase our herds. We have a great many men who receive blanks from us, and we invite them to let us have their results, and some of the results are exceedingly interesting. Mr. Ruddick just said it was quite possible to increase our product by $30,000,000, and I must say that I quite agree with him in that statement. I believe it is quite possible, with the same herds, to increase our products from $30,000,000 to $60,000,000, and I base that statement upon the results which I have seen attained by dairymen all over Canada. Take the case of a farmer on the Island of Vancouver, British Columbia. He gave me the results of his work for the last four years. He said, "When I started to keep records of my herd on these blanks of yours four years ago, I found my cows were giving 3,000 pounds. I weeded out the worst ones, and the next year they gave me 4,000, the next 5,000, and this year, 6,500 lbs." That man has more than doubled his return in four years, and what that man has done, others can do. I have a case now in Nova Scotia, where a farmer more than doubled the return from his cows.

A young man in Ontario started in five years ago with a herd whose return was about 4,000 pounds per cow. He kept records, weeded out the worst ones, and the result was that last year he made over 8,000 pounds per cow, and there is nothing to prevent every farmer from doing the same. If a man keeps a record once every ten days, he will at once effect a tremendous increase, because he cannot help paying attention to the care and the feeding of his cows. Take the case of the young farmer I mentioned. He doubled the yield of his cows from 4,000 pounds to 8,000 pounds. That farmer feeds very much better now than he did when he started, and it is absolutely necessary. You cannot get 8,000 pounds of milk out of the same feed that you would give when getting 4,000 pounds, so you see it is not in the selection of the cows, but it is the feed that you give them. The great trouble with the dairy farmers is the lack of care they give their cows. I think you will all admit that if there is any one thing that demands the attention of the dairy farmer, in Canada, it is the improvement of their herds, and that improvement can be brought about by no better means than by keeping a record. In fact, that is the only absolutely certain way of improving a herd. I am glad to see that not only the average farmer, but those who think they are well up in the business, are going into it more and more. I believe it will bring about a tremendous awakening in dairy operations. (Applause.)

The **Chairman**: I do not quite mean we can double our production; our export value is $30,000,000. I meant we would increase the total production by that amount. It is quite possible to increase the average yield by 2,000 pounds per year; that has been done time and again. Very much more than that has been done in Denmark, and the Danes are keener on this matter of record keeping to-day than they were in the start.

Prof. **Dean**: Having had sixteen years experience in keeping an exact record of a herd, I feel that I might be allowed to say something on this question. I think it is one of the most important lines of work in connection with dairying in this country. I believe that for many years our dairymen have stood still. They were satisfied to judge a cow by her outside appearance, and I say it is practically impossible to judge the value of a cow by looking at her. There is just one way, as pointed out by Mr. Whitley, and that is to get right down to testing, and find out what each cow is doing. I have a few figures from our records. I find our poorest cow in 1906 gave 3,952 pounds of milk, and our best cow gave 11,499 pounds of milk. There is a difference of 8,000 pounds of milk between the poorest cow and the best. In butter, our best cow gave 465 pounds, and our poorest cow 277, showing you what variation there may be in cows in the same herd, fed under the same conditions, and handled in the same way. I will not bother you with any further figures. I want to show you just what is possible in dairy cows. We have a cow in our herd that in the month of November, 1906, gave us 2,522 pounds of milk, testing 3.5 per cent. of fat. When you think the average yield of milk per cow in the Provinces of Ontario and Quebec is not more than 3,000 pounds of milk, and that one cow in one month of 30 days gave 2,522 pounds of milk, that will show you what a difference there is in cows.

To show you that this cow can keep that up, in the month of December she gave us 2,374, and in 61 days she gave nearly 5,000 pounds of milk, and her test for December was 3.7 per cent of fat. I see no reason why that cow should not another year produce 15,000 pounds of milk, she may run to 20,000 pounds.

Q.—What do you value that cow at?

A.—I think that if she were to be up at auction to-day, she would sell for $1,000. I think we have only touched on the fringe of this question, and the farmers in this country are awaking to the importance of getting better cows. You will notice that recently a bull sold for $10,000 in the United States. Why did they pay that money for him? Because for three or four generations it could be shown his ancestors were bred along dairy lines. I would like to see a breeding station where some men would study this question. This work cannot be done at an Agricultural College, because everybody thinks they have the right to stick their nose in and know all about it, and you cannot study that kind of work where everybody is interfering. This is a question which we dairymen must wake up about.

The PRESIDENT: I have a resolution which I would like to present:

"Moved by D. DERBYSHIRE, seconded by J. R. DARGAVEL, that this Dairymen's Association of Eastern Ontario has learned with feelings of profound regret, that it has pleased an all wise Providence to remove from the scene of earthly usefulness a distinguished member of this board, in the person of the late Henry Wade, of Toronto, a former presiding officer of this Association. He discharged the duties of office in a firm, yet courteous manner, that won for him the highest respect of his fellow members. Resolved that the Secretary send our heartfelt sympathy to the widow, relations and friends, in this hour of their affliction."

The CHAIRMAN: I do not think I need to add anything to what is expressed in the motion. It was my pleasure to know Mr. Wade for a good many years, and I learned to know him as one of nature's gentlemen. I am sure we all regret that he has departed from amongst us. The resolution was carried by a standing vote.

ADDRESSES OF WELCOME.

The President, in taking the chair at the afternoon meeting, spoke of the splendid manner in which the City Council and Board of Trade of Ottawa had acted toward the convention.

Hearty addresses of welcome were then delivered by Mayor Hastey, Ex-Ald. Hopewell, and Messrs. John R. Wood, J. R. Reid, and Cecil Bethune of the Board of Trade.

In reply, the President expressed himself as delighted with the reception given the Association. "Of course we expected it from the nice way you treated us when we came among you four years ago. We had a convention here twenty years ago and nobody paid the slightest attention to us. We were not very much of an institution that time, but to-day they recognize us everywhere we go, and they are bound to know something of what we are doing, and that we are the industry that is leading Canada in connection with progress. You will be delighted to know that we have more than doubled the exportation of butter and cheese and bacon in the last four years, and we hope that, with the addresses we will have at this convention, we will be able to build up this industry in this locality.

ECONOMIES ON THE DAIRY FARM.

By J. H. Grisdale, Agriculturist, Experimental Farm, Ottawa.

I want to draw your attention for a short time this afternoon to economies on the dairy farm,—the best management and methods of carrying on the work on the dairy farm for the production of milk. Let us review very briefly the history of agriculture in this country, and when I say this country, I mean Eastern Ontario and Quebec.

We see the farmer clearing up a little bit here and there, and fencing it around to keep the cattle away. He pays very little attention to the feed the cattle receive during the summer, his great ambition being to get a little more land here, and to keep it from the inroads of his cattle. As a consequence of this we found a few years ago that the farms were divided up into a number of small fields. Dairy cattle were introduced a few years ago, and they have been increasing in numbers, but the farmers have not been making the progress they should in the management of their farms and the arrangements of the fields, and I think it it is time to make a change.

The great ambition of the dairy farmer should be to keep as good cattle as he possibly can, and the Department of Agriculture has been working to help the farmer in this particular by advocating tests of herds, and by forming testing associations, and all this work is good in its way. The better we can make our herds the more profitable the dairy business will be for Canada and for every individual engaged in it. After we get the best cattle, we then want to keep them as well as possible, not only in winter but also in summer. If I may judge from the conduct of the average farmer in this country, winter seems to be the chief time when he is ambitious of care for his cattle. He is always thinking of how he will get enough feed for his cattle during the winter, and we often find them wandering about in the summer looking for feed. If the grass is good they are all right, but if we get a dry spell and the pasture fails then the average farmer has no provision made for feeding his cattle. Cattle should be well fed both in winter and summer. Therefore I say the best thing is for the dairy farmer to get a herd of the best animals he can, and then keep them as well as he can, and thirdly he should make that herd as large as possible, because in the increasing of our dairy herds lies the future of this eastern part of Ontario. We have a limited number of farmers, and there is a limited amount of land, and, if we are going to make the progress that we should and develop the dairy industry, we must do it by increasing the number of our dairy cattle, and by increasing the production of the individual cow. We cannot be satisfied to hold the place we now hold. Surely we will not be satisfied, fifty years from now, to be able to say that in the year 1906 we produced so many million dollars worth of butter and cheese, and we are doing as well to-day. I hope to see this part of Ontario, ten years from now, producing twice as much butter and cheese for export as we are producing to-day, and I feel confident that this can be done by improving our herds, feeding them better, and increasing their number, and they can be kept on the same land as we now have under cultivation.

In order to do this the farmer must study the best means of cropping his farm, and the subject I have selected for this afternoon is, "How can we manage our farms so that we shall be able to make the cattle we have produce a greater quantity of milk, feed them better, and increase our herds?"

In the first place, I think, if we are going to do this, we must change our methods, very largely, in the handling of the land and the arrangement of the fields. In my experience there is no work which will give greater results than the one to which I wish to draw your attention, that is the dividing of our farms into regular equal fields, and having them so arranged that we can follow rotation and get the greatest results with the least labor. During the last few years we have tried a large number of rotations and a number of methods of cultivation, and the system outlined has given the best results. I have tried it, and have seen it tried, not only on the Experimental Farm here at Ottawa but on various other farms, and every place where it has been tried the results have been simply wonderful. Supposing you have a one hundred acre farm of arable land, take one-eighth of the farm, and in one corner one-sixteenth is set apart for paddocks or small fields for young cattle or for putting cows in at night. On the other side he has a vegetable garden and orchard, and three or four acres for swine. The dairy industry and pork production are inseparable, we must combine the two, and in order to make the production of bacon successful, we should have a small area of land devoted to it. On the Experimental Farm we have ten acres devoted to pork production, and there is no portion of the farm that gives a return equal to that ten acres.

The rest of the farm, which will consist of three-fourths of the total area, or 75 acres, is divided into four equal fields. We cannot always get them in that way, but we can get them as equally arranged as possible. Try to have some part of each quarter of the land near the buildings so that it can be used for pasture at night. Divide it into four equal fields of about 19 acres each. This field near the barn in 1907 would be pasture. In 1908, follow with a crop of corn or roots or potatoes; in 1909, with a crop of grain, and at the same time sow clover and timothy, from ten to twelve pounds of clover per acre, and about ten pounds of timothy. If you have very strong land that may possibly be too heavy a sowing, but I have never seen a heavy sowing fail. After the hay we have it a year in pasture. Three-fourths of the area, or 55 acres, is devoted to crops for winter use. If we are going to make a success of our dairy farms we must consider feeding the cattle in summer more carefully and more generously than in winter, because that is the season of the year that the average farmer makes his harvest from the cattle. Every farmer can pick some field close to his barn, and devote it to the care of crops for summer feeding, even if he should have other means of feeding his cattle in summer, and even if he should have sufficient pasture. Pasture is the most expensive method of feeding cattle. He will find it profitable to grow crops suitable for summer feeding. I have found that the best method of growing crops for soiling is to select a portion of the farm adjacent to the buildings, and divide that portion into three equal fields. Have a field of six acres divided into three fields of two acres each, and follow the three year rotation; first year, one field of clover, the next field mixed crop of oats and vetches, and peas and vetches, sowing about four bushels per acre, and after that mixed crop, sow red clover and alfalfa, using about 18 lbs. of clover seed per acre. In the third field we have corn; sow two varieties, an early corn and a late corn. Change the rotation in each field so that each year we will have a crop of clover, mixed grain and corn. In this way we have a succession of green feeds that last from the middle of June, right through to September. The alfalfa is as early as the 5th of June. You must be very careful the land you put in alfalfa is well drained. It should be on a hill or a slope, where water will never lie winter or summer.

We have found the Longfellow and Leaming corns to be the best varieties. Longfellow will be available about the 15th of August, and the other will come in succession, and last until the end of September. On most farms I have visited I have found the proportion of crops for summer and winter use quite different, and I say we must change that, because it is in summer that we get our returns from the cattle, and we should give them more attention than we do. I travelled a good deal in this district last summer, and I found hundreds of herds not giving the milk they should, because they were starved. They had nothing to eat, and that state of affairs might have been changed had the farmers given the attention to summer feeding that they should. There is always some part of the season when soiling crops will grow, and they will maintain their bulk during a dry season. I know dozens of farmers who are following this method of cultivation, or something similar, and everyone of them that I visited said that their cows were giving as much milk as usual, although farmers who had not followed this method were receiving very little milk, and some of them stopped milking their cows in September.

What are the advantages of such a rotation besides providing feed for dairy cattle in summer? The advantages are simply remarkable, because this rotation not only provides food for the cattle the year around, but it also enables you to keep more cattle on the farm. Five years ago a certain farm was taken over by a friend of mine and this system of summer feeding was introduced. The first year was a good year, and yet he was only able to keep on that farm 15 head of cattle, and he had at buy $200 worth of rough feed to winter them, and last winter he wintered 29 head of cattle and sold hay, and that was due to his having followed this rotation. Fields that were giving a ton, and a ton and a half per acre gave, last year, three ton per acre, and last year was a bad year for hay. The year before that gave him five ton per acre. He used no other fertilizer except barn-yard manure, and he kept 29 head of cattle, 4 horses, and a number of swine, and only bought $50 worth of meal. His cows gave him $55 worth of milk apiece in the summer. You may follow a five year rotation if you like but I know of no rotation that will quite come up to the four year rotation.

Many of you are familiar with the results obtained by that thinking chap over in Philadelphia, who took a little bit of a farm a number of years ago and set to work to see what he could do with it. There were only 15 acres on the farm, and it would not grow enough for one cow and a horse, and now it is keeping thirty head of cattle right along and selling hay off that 15 acres. When he took the farm it cost him money to keep it, and how many farms are there to-day that cost you money? I can name you a dozen farmers who are not earning wages. That is the kind of thing we ought to change and we can change it if we try. This farmer near Philadelphia had to use his hard earned cash to keep the farm running at first, and to-day he is making a revenue of $3,000 a year, and that is what I call farming.

A MEMBER: What does he sell?

A.—Milk.

Q.—What year do you manure?

A.—We always manure with the corn. I have not said a word about cultivation of any of the crops; I just want to impress upon you the method of rotation. After the pasture we leave it in sod all winter and haul the manure out during the winter time and spread it and plow it down about the 10th of May. Plow four or five inches deep and then roll it again and disc-harrow again once or twice, and then you will have a seed bed fit for onions almost, and, when you plant corn on it, it cannot help but grow. It has got to grow. You must get the land properly cultivated for corn. You will have the warmth and the necessary moisture and the vegetable food and the corn cannot help but grow. If you are going to plant roots you had better plow in the fall, especially for mangels. I think the best method for corn land is to plow it first. We have disked it and turned it over one way and another, but the good old way of plowing is the best.

Q.—What about the hay crop?

A.—It will not be so rich in clover, although it will be richer in clover than if you had two years of hay in succession.

Mr. NESS: Is it not the case that, where you put the pasture after the grain, you will find some bare spots?

A.—Yes, you will have a few bare spots because you cannot prevent the cattle from tramping. A good thing is to have two entrances to the field, and then it will not be broken down so much. We have followed a two-year rotation on our land; no hay. Supposing a man has land where he can grow his hay. We find we can keep two cows per acre during the three or four months of pasture time and get a very fair return, but if you put two cows per acre on old pasture it would be bare in two weeks. If you harvest the hay off that field you can feed four cows per acre, and that will show you that pasture is the most expensive method of feeding cows that it is possible to follow. By putting them on old pasture you are throwing the land away. Of course there is a certain good effect on the land by allowing the cows to roam over it part of the season. You will get more corn the next year after pasturing the land, perhaps two tons per acre more, but you will only get a return of about $8 per acre when it is in pasture, and when it is in hay you will get a return of about $20 per acre. Do not devote half your farm to pasture, because, although you are economizing in labor, you are throwing away half the value of that part of your farm, and, if it is old pasture, you are throwing away three-fourths of it.

Another point is the importance of having supplementary feed for your cattle. Some of you would say, "Would it not be better to have silage for your cattle in summer?" Yes, it is better but they like the green crops better than they do silage. We fed our cattle entirely on silage last year and they did not do as well as when on green crop.

Mr. STUART: Is there any system of feeding equal to grass?

A.—If you take June grass in a year when there is not too much rain and put the cows on it in pasture, that will give them all they want without walking a mile to get it, and I do not know any feed that will then come up to it; but you can easily have too much grass or too little grass, and that is where the man comes in. He should use his brains and have just as much feed and use it economically. Supposing Mr. Stuart is right, and that there is no feed which comes up to grass; there is no feed equal to a sufficiency of the right kind of grass, but there is a very much better feed which will give almost as good results in the way of milk, and very much better results when it comes to your pocket. I think that limiting the pasture to one field of the whole area of the farm is a method that is going to give the best results.

Q.—Would you think it advisable to have your pasture in four different fields, and change your cattle from one pasture to another?

A.—Yes, there is an advantage in that; but when it comes to plowing time you have to take down your fences or lose a lot of land along the fences.

Q.—You would not consider it worth while to put up a temporary fence?

A.—I have tried that, and it does pay for the labor of putting up the fences. We have a herd of about fifty at the Experimental Farm that we pastured last year, and for that fifty head we had fourteen acres of pasture land. Of course they did not live on it, but they lived on it almost entirely a couple of months. All they got in addition to the pasture was a little bit of meal. We kept them in in July and August in the daytime and in September we kept them in at nights. The fifteen acres was in alfalfa. What I want to call attention to is the importance of planting the farm so that the cattle will have a good supply of food in summer as well as in winter, and have food of a cheap character. It is not enough to give them feed regardless of cost; we must study economy.

The following circular has been sent from the Central Experimental Farm to dairy farmers:

Every year every dairy farmer loses much money on account of the scarcity of grass or by reason of the unprofitably large area of land that has to be used to insure good pasture during the months of July and August.

If the average dairy herd is to be profitable, every cow must be kept up to her full capacity during those two months, as well as during the preceding and succeeding months.

The quantity of milk produced during September, October and November is very materially influenced by the way in which the cattle are fed in July and August.

Cows receiving insufficient food during those two months naturally decrease very rapidly in milk flow. Once the milk yield is materially decreased for any considerable length of time, it cannot during that season be again brought up to what it might otherwise have been.

Hence although pastures are usually good or feed plentiful during the months of September, October and November, when prices for cheese and butter are high, we must, in order to get the full benefit of these high prices and abundant supplies of feed, have been feeding well during the months of July and August.

The cheapest, easiest and most certain plan of insuring an abundance of feed during the months of July and August is to make use of soiling crops.

Experiments at the Experimental Farm as well as elsewhere would seem to indicate: Vetches, pease, oats, clover and corn, as the most suitable crops for the purpose.

Dairy farmers are therefore recommended to prepare and feed somewhat as follows for each 10 cows in their herds:

1. Clover, 1 acre: To have been sown with the mixture of pease and oats the previous year as described below.

Feed off June 20 to July 15.

2. Pease and oats,, ½ acre: Sow 1 bushel pease, 1½ bushel oats and 5 lbs. red clover seed on ½ acre of land about the first week in May.

Feed off July 15 to 31.

3. Pease and oats, ½ acre: Sow same mixture on another half acre about 3rd week in May.

Feed off August 1 to 15.

4. Corn, ½ acre: Sow 10 lbs. Longfellow corn (or other small variety) in hills 3 ft. apart each way. Sow 3rd week in May or as early as possible. Sow on well drained land, clover sod manured at rate of 20 loads (tons) per acre.

Feed off August 15 to 30.

5. Corn, ½ acre: Sow 12 lbs. Leaming (or other medium variety) same way as above.

Feed off in September.

Mr. L. PATTEN then took the chair, and said: I am sure we have all been interested and profited by this address and if there are any more questions I know that Mr. Grisdale will be pleased to answer.

Q.—Have you had any experience in making alfalfa into hay?

A.—Yes, it makes good hay.

Q.—Alfalfa or red clover and alfalfa?

A.—We have always succeeded in getting it very well cured except in a rainy season. Where we have grown alfalfa by itself it will cut from five to ten days ealier than where you have red clover with it. Where you mix them together the second crop is largely alfalfa and the third crop is practically entirely alfalfa. Where you mix them together for hay the red clover kills out the alfalfa in the winter or the first crop in the spring. We get the best results for hay when the alfalfa is sown pure, and it will last as long as you like. We have some plots where it has been grown twelve or fifteen years, and it has proved as hardy as red clover. The only field that came through last winter was alfalfa. Every field of red clover was killed.

Q.—Do you feed ensilage alone?

A.—We give meal.

Q.—According to your system, how many cows would 100 acres carry comfortably?

A.—That is a hard question and if I answered it according to my belief you would think I was exaggerating.

Q.—100, I suppose?

A.—It would carry 100.

Q.—The next trouble would be to get help?

A.—It means taking a little more care of the milk and paying higher wages. According to our friend in Philadelphia it would carry 200. I would not go as far as that, but there is nothing to prevent your carrying 75. We have a 200 acre farm and we are carrying 110 in summer and 150 in winter, and we do not buy any feed except meal. We have over 20 head of horses, and we do not buy any hay for them or any roots.

Q.—You get a lot of manure from the city?

A.—No, not for the farm; the orchard gets some, but we get no feed from the orchard.

Q.—Do you buy any fertilizer?

A.—No.

Q.—How many hogs can you keep on 100 acres?

A.—I would keep the hogs in proportion to the number of cows, the two go together. A man ought to keep about four pigs for each cow, and supposing he has 20 cows he ought to have about 80 pigs. He should have ten or a dozen little chaps; ten or a dozen a couple of months old, and ten or twelve further on, and so on, and then he would be using his by-products to the very best advantage.

Q.—Would you advise keeping sheep?

A.—No; I have no objection to a man keeping sheep, but I think sheep and beef cattle go better together than sheep and dairy cows. (Applause.)

The CHAIRMAN: I think Mr. Grisdale has touched the key-note of the situation from the dairyman's standpoint, and I am sure his address is one that has been instructive and profitable to everyone here.

STABLE HYGIENE.

BY DR. J. G. RUTHERFORD, LIVE STOCK COMMISSIONER, OTTAWA.

I was much impressed with Mr. Grisdale's remarks. Extensive occupation of land is one of the great curses of agriculture on this continent. There is nothing more painful to the student of agricultural methods than to see the manner in which people scatter their energies over large areas of land, producing practically nothing to what they would be able to produce if they were to centre themselves on the principle of intensive cultivation. You see that even in the Old Country. It is always a very sad thing to me to see a very large area of land that is not being properly cultivated. Just across the channel in Belgium and Holland farmers are bringing up large families on two or three acres of land. In the country where I lived a good many years, Manitoba and the west, our people are just simply crazy on extensive occupation of land. If they were to devote their time and attention to much smaller areas they would succeed far better. It is possible for the dairy farmer of Eastern Ontario to succeed in maintaining in comfort and in plenty a very much larger number of animals than is generally supposed to be the case.

I want to say a few words to you on a subject with which I may, perhaps, claim to be more familiar, and one upon which you will give me, perhaps, a better hearing, that is the subject of stable hygiene, which is one of very great importance to the stock owner. Embracing, as it does, a large number of widely differing branches each capable of almost indefinite elaboration, it goes without saying that, on an occasion of this kind, it will be quite out of the question to attempt to deal with it as it deserves. I shall, therefore, with your permission, confine myself to the discussion of the practical side of the subject, qualifying the expression of this intention, however, with the general statement that the views expressed are, in almost all cases, in strict accordance with the results of scientific research. In some instances I intend to advance theories of my own, the fruit of personal observation or investigation; but on these, as in others, I hope, in case of discussion, to be able to give satisfactory reasons for the faith that is in me. I have no wish to dogmatize, and having no pretensions to universal knowledge on any branch of the subject, am only too willing to benefit by the larger experience of better information of any one present.

Parkes, the greatest authority on the subject, defines hygiene as "The art of preserving health." He says: "It aims at rendering growth more perfect, decay less rapid, life more vigorous, death more remote." He also declares that, with a practical application of a perfect knowledge of the laws of life, disease would be simply impossible. That knowledge, however, we do not know, nor are we ever likely to possess it. We must, therefore, as in other lines of life, walk according to our light, making the best use of the information at our command.

Stable hygiene is a plant of comparatively recent growth. Little more than a century has elapsed since Prof. Coleman first advocated the intelligent application of the principles of sanitary science to the domestic animals. The success which attended his efforts rapidly revolutionized stable management in Great Britain, and he and his successors in the good work have undoubtedly saved many millions of pounds to the stock owners of the civilized world. Even yet, however, there is considerable room for improvement in most stables, while in a new country such as ours, especially with its peculiar climatic conditions, there is much to be learned as to the most intelligent, and therefor the most profitable, methods of housing and managing live stock. Before going into detail I wish to guard against misunderstanding on the part of any of my auditors in one particular. I have lived nearly a score of years in Manitoba, and am sufficiently familiar with the conditions of life on the Western farm to be well aware that some of the theories I am about to advance cannot possibly be adopted in all cases. To those who may be inclined to advise criticism on this ground, I would point out, that after all, it is only a question of degree. If one cannot, through force of circumstances, adopt hygienic methods altogether, he should at least do so as far as he can. As we say in my profession regarding wounds, "If your treatment cannot be asceptic, let it be as asceptic as possible.' The experiment will be well worth trying, and the results gratifying beyond expectation.

Ventilation. No stable can be healthy without a plentiful supply of fresh air, and in our severe climate the problem of efficient winter ventilation is one of extreme difficulty. A lengthy and most interesting essay could be written on this subject alone, and it is with regret that I feel myself on this occasion forced to treat it with more brevity than its importance merits.

Pure atmospheric air is composed of oxygen, nitrogen and carbonic acid, in about the following proportions. Nitrogen 78.98, oxygen 20.99, carbonic acid 0.03 in each 100 parts of air. The nitrogen is simply of use to dilute the oxygen, being of itself incapable of sustaining life. Under ordinary conditions otherwise pure, contains in the gases mentioned, moisture, traces of ammonia, floating particles of organic and inorganic matter and more or less ozone, which last is only another form of oxygen. The ammonia contained in air is not of itself hurtful, but when excessive indicates the presence of other impurities.

Of oxygen, according to Mr. Angus Smith, a pure air contains, as I have already stated, 20.99 per cent. and average air 20.98 per cent., while very bad air begins at 20.96 per cent. As oxygen is very rapidly consumed in the process of animal respiration, these figures have a striking signification.

Carbonic acid, when existing in the air to a greater extent than .03 per cent. or .04 per cent., is proof positive of a reduction in the amount of oxygen, and an increase in the organic matter. The expirations of a healthy animal contains 19 per cent. instead of 21 per cent. of oxygen, and about 2 per cent. of carbonic acid. It will thus be readily seen that the air in a stable full of animals and without proper ventilation soon becomes overloaded with carbonic acid. The sense of smell is a very good way of detecting the presence of carbonic acid. Taking .04 per cent. to start with and allowing .02 per cent. for ordinary inside air, we have .06 per cent. of carbonic acid. Now, according to Dr. Angus Smith, the existence of .08 per cent. is unpleasant to most of us, while the presence of one part per thousand in the air of a room renders it odious and unwholesome. Experiments have shown that in badly ventilated stables the air may contain as much as 17 parts per thousand of carbonic acid, with, of course, its accompanying proportion of organic matter. The effects of such an atmosphere on the animal economy are indescribable, especially when we consider the lack of oxygen and the large amount of organic matter thus shown to exist. Let us see what this organic matter consists of. That found in the air of stables comprises, according to Prof. Fred Smith, of the Army Veterinary Department, cast off epithelium or scales from the mouth, air passages and skin, organic vapors from the lungs and skin, spores, acari, fucuses in fine division, and vapors derived from the decomposition of materials from the intestinal and urinary passages. Among these organic particles have been found many varieties of disease germs, such as those of anthrax, tuberculosis, and glanders. When we consider that the mucous membrane of the respiratory tract in the horse has an area of nearly 300 square feet or over five times that of the outside skin, and that every portion of this surface is especially adapted for rapid absorption, we must admit, without further argument, the necessity of thorough ventilation if we desire to keep our stock in good health and condition. I could quote many most interesting facts and statistics showing the wonderful results achieved by the introduction of effective ventilation in army stables and similar large establishments, but time will not allow me to do so, and I must pass on with another terse quotation from Dr. Parkes who affirms that "Disease and health are in the direct proportion of foul and pure air." The amount of air inspired by a horse varies greatly, but when standing still it is as a rule not much over 100 cubic feet per hour. In order, however, to afford him this quantity of reasonably pure air in the stable, Prof. Fred Smith, basing a most careful calculation on the quantity of carbonic acid exhaled, proves conclusively that it is necessary to furnish him with no less than 15,000 cubic feet per hour. This theory, which I may say I consider incontestably correct, has had a remarkable effect in dispelling the erroneous ideas of many architects in regard to the value of cubic air-space, which, while certainly very important, can never take the place of a thorough system of ventilation. The greater the air space in the stable, the less frequently need the air be changed, but this, important as it doubtless is, constitutes its only value. For instance, a horse having 500 cubic feet of air-space alloted to him, must in order to obtain his 15,000 cubic feet of fresh air have it changed thirty times per hour, while one with an air space of 2,000 cubic feet will only require it changed 7½ times. Again, while the first will require during the first hour 14,500 feet of fresh air and the second only 13,000, both will, during the second hour and each hour thereafter require the introduction of an equal amount, viz., 15,000 feet. I have given this subject more careful thought, and I am satisfied that while in moderate weather we need have no great difficulty in reaching Prof. Smith's standard, we cannot hope to do so during the severe winters of this country. We must, however, do the best we can, and as I am fairly well satisfied with the results of my own experience in regard to ventilation in Manitoba, I propose to lay them before you and to let you judge for yourself. I may explain, that having experimented for years with all kinds of ventilators, I was, like almost every one else, very badly satisfied with all of them, and inclined to despair of ever finding a system in which the inlet would always be an inlet and the outlet always an outlet. I got my first start from a very intelligent English farmer who was on a visit to the Province some eight or nine years ago. He recommended placing U pipes under the wall behind the horses and drain tiles through the wall over their heads, but was forced to admit, on cross-examination, that when the wind blew in through the latter, his ventilation went on strike till it changed. I adopted the U pipe part of this plan, using, however, wooden boxes, but substituted suitable side louvres at the top of a large shaft running to the roof, for the drain tiles. These, however, were not a success, for the wind was sometimes in the opposite direction in the morning from that in which it had been at night, and on such occasions the stable "smelt to heaven." I finally closed up the louvres altogether, putting in instead a galvanized iron pipe or chimney of considerable dimensions furnished with on ordinary rain cap, and a large damper manipulated by cords from the stable floor. When this damper is open, the foul air, being warm, rapidly rises, passes out through the chimney and is steadily replaced by fresh air sucked through the U pipes or boxes. By closing the damper the inrush of air through the lower pipes is at once checked, while a partial closure has a corresponding partial action on these inlets. In this way the whole system is under easy control, and can be adjusted to suit the weather or the number of animals in the stable. My stable is not ceiled, but I think the system would work even better if the ceiling sloped slightly upward to the outlet shaft. There is no draft, as the fresh air is sucked—not driven—in, and therefore diffuses itself gently through the stable. This plan has stood a fair trial, having now been in operation for upwards of seven years. I must say that I would not exchange it for any other system of winter ventilation I have ever seen, and will not, therefore, occupy your time by describing other methods. By this plan a stable can be kept free from odors, and at a temperature during the coldest weather of from 35 to 40 degrees Fahrenheit, which is quite warm enough for healthy animals of any kind.

The whole tendency of the medical profession at the present time is to get back to nature in regard to human life, and if this is the case with regard to ourselves, if it is true that people should sleep with their windows open and out doors if possible, why does it not stand true to a very much greater extent with regard to horses and cattle. I have a herd of cattle that were at the dairy farm at Nappan and were badly affected with tuberculosis, and they were going to kill them, and I asked the Hon. Mr. Fisher that these cattle should be given to me, and we brought them here. We kept them out doors at Nappan all last winter, and we brought them here in the spring, and they are now living out doors over here on the Quebec side of the river. They have an open shed where they can run in from the snow and rain, and they are in the bush, and they are out doors. There is no trouble there with ventilation, I can assure you; and it is very interesting to watch the calves arrive with their overcoats on. I can assure that if you keep cattle in stables where they are protected from the wind and rain, but where the temperture is just about freezing point, and take young growing animals and horses, you will be surprised how well they will eat, and how much healthier they will be. (Applause.)

Mr. Henry Glendinning: You will notice that I am on the programme to open the discussion upon Dr. Rutherford's address. You may be a little surprised when I tell you that I didn't know what Dr. Rutherford was going to say until he said it, therefore, I am not in very good shape to open the discussion. However, the President tells me that I am to open the discussion on Professor's Grisdale's address as well.

In the olden days bran was wasted; you could get it for four dollars a ton. The farmers thought there was nothing in the skin of the wheat; but for years back the experimental stations have been preaching up the value of bran, and they preached it up so high that you can hardly buy it at twenty dollars a ton. How much is there left to the farmer when he buys bran at twenty dollars a ton? Although the price of dairy products has been high, the net profit to the farmer when he buys a large amount of feed is not very much. Is there anything that we as farmers can feed to our cows that will take the place of wheat bran? I believe that you will all agree with me that wheat bran is one of the best feeds for dairy cows. What is there in it that makes it so good? It is the nutriment that we call protein. We find all the feeds for the production of milk contain protein. Is here anything that the farmer can grow on his farm that will take the place of bran? Some one will say that we can raise oats or peas, but are they not higher than bran? Mr. Grisdale told you that for a number of years they have been growing alfalfa at the Experimental Farm. He said they had it there for ten years continuously. We have nearly as much digestible protein in a ton of alfalfa hay as we have in a ton of wheat bran. That being the case, and I have found it to be nearly as good. I think it is better than bran, because we have the advantage of being able to produce it cheaply. I believe you can get it into your barns and pay for all labor in connection with the growing of the hay, and put it into your barns at from $2 to $2.25 per ton. The stock are very fond of it, and if you have a lot of that feed in your barn, you will be in a good position, and you will have made at the end of the season a good deal more money from your cows than if you had to depend on bran. I have been experimenting with alfalfa. I have been growing it for ten years. Although my first experiment was not satisfactory, we finally succeeded in getting a good stand, and we can keep it growing from year to year. Last year my alfalfa fields were bare during the whole winter, we had scarecely enough snow to make the fields white, but when the spring came it never looked better, and we had the heaviest crop we ever had on the farm. I am satisfied we had seven tons to the acre. I do not want to say that you can produce that on every acre, but I am sure where you can grow alfalfa successfully you can always count on a very large crop. We have never grown less than five tons to the acre. And if you can succeed in getting four tons to the acre and something practically as good as bran, is there anything else you can grow that would be as good for feeding to milk cows. When we feed alfalfa hay and good corn silage we have the best results. I would not ask you to grow less corn. But I would say grow a great deal more alfalfa.

I had been reading about a certain culture that you apply to the seed, and last spring I thought I would try it, and applied to Prof. Creelman for enough to treat two bushels of alfalfa seed. We followed the directions they gave us, and we were very careful that the seed did not mix with the other seed that had not been treated. It was sown with a nurse crop of three pecks of barley per acre, and in many cases with the seed that was treated with the culture, the plants were as tall as the barley, standing at least three feet high. I do not say they were all that high, but many of them were. I did not see the untreated field the whole summer, but my son, who was cutting the field, said that there was part of it that would have to be plowed up. I asked him what part of it, and he said that part that we did not treat with the culture. I went up and looked at it, and found plants only two or three inches high, and they were weak sickly plants, while on the treated part every plant was robust. And when we have such marked results as that, I have no hesitation in recommending that culture to farmers who have never grown alfalfa on their farm. With the first piece of alfalfa I grew on my farm the plants were very small and weak and sickly looking, just the same as those that were not treated. We sowed that field for hog pasture the second year, and the next year the hogs pastured on the field and ran into the adjoining field, and so carried the manure from one field to the other, and carried the dirt into the adjoining field. And that field that was run over by the hogs from the alfalfa pasture had as strong a catch as we get from the field with seed that was treated. I believe that the hogs had the effect of inoculating the whole of that field so that we had a strong growth of these young plants. The field where the seed was planted that was not treated had only recently been put on alfalfa, and that is the reason why I thought the culture gave such good results. If I grow any alfalfa next year I am going to apply to Prof. Creelman for the culture.

Q.—What do you think about leaving cattle in the stable down to zero?

A.—I think it is of great importance to have fresh air in our stables. They should not be too hot. In going around to our institute meetings, they have a big fire in the hall, and they have the windows down, and it is not very long until the place is very uncomfortable; and I fancy that cows are like the human beings, they want comfortable quarters too. Very warm quarters are not comfortable, and I think pure air is more essential than warm air. I think there is one thing we lack in this country, and that is ventilation, not only in our stables, but in our dwellings and public halls; and I think Dr. Rutherford should preach that from one end of the country to the other.

Q.—How much alfalfa seed did you sow to the acre?

A.—Twenty pounds. I believe that with that treatment we get a safer catch from fifteen pounds that we would from twenty pounds because every seed appeared to grow. Mr. Grisdale said that they had been growing five or six pounds alfalfa seed in his experiments to red clover, and he found the red clover has a tendency to smother out the alfalfa. I think that is all right where you want to cut and plow it, but that would be no good on the line on which I am talking, because the red clover is a biennial plant, and at the end of two years it dies, therefore we have to put in plenty of seed. One remark I have heard people make with regard to alfalfa was that it was too coarse. That depends on how thick you grow it. If you plant it thin then it will grow long and coarse, but if you plant it thick it will be very much finer; therefore, I say, put on plenty of seed. Do not pasture your alfalfa fields. It is all right in Mr. Grisdale's case, because he intends to plough it up. I lost my first alfalfa by pasturing it. At the entrance of my alfalfa field where the implements and horses go in to cut the alfalfa it is getting thinner and thinner all the time, and I think it is due to the tramping. I think alfalfa can be grown in the greater portions of the Province of Ontario on high land. Nearly every man has high land that is well drained, and there I would say put in a piece of alfalfa.

Q.—What effect would a top-dressing of manure have on it in the winter?

A.—We have never top-dressed our alfalfa field with any more than three loads to the acre. We have top-dressed with wood ashes, and they gave a very marked result.

Mr. Kidd: How many times did you cut this crop that you took off seven tons to the acre?

A.—This field has been cut four years, and cut three times each year, with an exception of a year ago, then it was only cut twice, because one of the crops was a crop of seed.

Mr. **Grisdale**: Did you get any seed?

A.—Yes, I got about a bushel to the acre. I do not think it will pay from the money standpoint, but I think it would pay perhaps in other ways. I had the advantage of having a good quality of seed, and that is a very hard thing to get, as so much of the alfalfa seems to be full of rib grass.

Q.—Do you think it is possible to keep these stables comfortable and still keep them fresh?

Prof. **Rutherford**: I certainly think it quite possible to keep either horses or cattle, milking cows, feeding cows, feeding stock or breeding stock perfectly comfortable with an adequate supply of pure air.

Q.—Fifty degrees?

A.—No; you cannot keep them at fifty degrees and give them an adequate supply of fresh air.

Q.—What degree should a stable be kept at?

Dr. **Rutherford**: Anywhere between thirty and forty, in my opinion quite warm enough. Of course for young growing stock, horses, or young cattle I do not think it necessary to keep them that warm, if they get absolutely fresh air.

Prof. **Dean**: I do not agree with Dr. Rutherford. I do not favor this extremely low temperature for milking cows. I do not think it is possible even with the cows which we have now to get yields of 8,000, 10,000, 12,000 and 15,000 pounds of milk if you keep them at a low temperature of thirty or forty degrees. I am a great believer in fresh air, and in our own stable we have a system which I think works quite satisfactorily. We bring in fresh air at six different points in the stable so that it is distributed at the ceiling. I must again differ from the Doctor when he says the foul air in the stable would all be at the ceiling.

Dr. **Rutherford**: I say the foul air rises, and if so will go out at the ceiling.

Prof. **Dean**: I think you will find considerable of the foul air on the floor as well. The objection I have to ventilating from the ceiling is that you cool your stable too rapidly, and by having a system of ventilation which has an opening both at the ceiling and at the floor I think is much better. We aim to get our stables at about fifty-five degrees. I like plenty of fresh air; but if you want the best of results in milking I do not think you should let your stable go as low as thirty or forty degrees. At temperature in the day time of fifty to fifty-five degrees would give good results, and at the same time give healthy stock. Since we put in this system of ventilation we have not had a single case of tuberculosis, and as far as I known there is no tuberculosis in our herd.

Q.—Explain that system of ventilation?

A.—You will find it fully described in Bulletin 143 of the Department of Agriculture.

Dr. **Rutherford**: I think my system is the best. I think the system Prof. Dean has described is a very good one, but it has several faults. I do not question Prof. Dean's statement that he could get for a year or two more milk from a cow under hot-house conditions. I remember one professor at the Ontario Agricultural College advocating keeping a cow tied up by the neck all the year around as the most profitable way of getting a larger supply of milk. I do not believe in hot-house plants, and I do not believe in hot-house stock. I believe in animals being kept in their natural condition.

Mr. D. M. **Macpherson**: These are important questions—the yield per cow, and the life of a cow. I have listened with a great deal of pleasure to Dr. Rutherford's explanation of a system which is a very good one. There does not seem to be very much difference between his and Prof. Dean's except that Dr. Rutherford keeps his cattle cooler. It is quite evident that a considerable quantity of the carbonic acid goes up, but from the experiments that have been made, a certain portion falls to the floor when the temperature rises to a certain degree. It seems to me that you could combine the two systems and draw a portion of the foul air from the bottom, and a portion from the top, and take in sufficient fresh air that you would have perfect ventilation.

I would like to discuss Mr. Grisdale's interesting address. I have given a life time to the study of the economic production of milk and the work of the farm, and I have tried his system. I think if you sow the seed with the grain for the green feed it will get smothered up. Instead of dividing the land into four fields, I would divide it into six, and I would take two crops of hay, two crops of peas, one of grain, and one of corn. You will have two fields that you can put your cattle into day or night, and you can change the pasture weekly, or have one pasture for night and one for day. I prefer to take two crops of hay, for the reason if the first crop is pastured, the tendency is to destroy a large number of roots of the delicate plants. If you cut the hay the first time, and take another crop of hay, and then top dress, you have the very best conditions for pasture, and you will have the best condition for hay for the coming year, and the best condition for pasture for two years.

Mr. **Grisdale**: We are trying two systems of ventilation, and I would rather not say anything about it for another year. I think just the opposite of what Mr. Macpherson says about the rotation. The more we plow our land and work it the better will be the rotation, and I think if he gets 100 pounds of milk from a four year rotation, he would only get 80 pounds from a six year one, and if he continued it into a three year rotation he would be more likely to get 120 pounds. The shorter the rotation the greater the returns every time. (Hear, hear.) We have had rotations extending from three to six years. The shorter the rotation the greater the returns.

Mr. Macpherson: After the first year it is top-dressed for the pasture, and the second crop of hay taken.

The **Chairman**: Does not the clover get cut off the land in that way?

Mr. **Macpherson**: Yes.

Mr. **Grisdale**: I have seen over and over again where it has taken three and four acres of pasture to carry a cow under these conditions, whereas we can carry two cows per acre. There is one thing I like about Mr. Macpherson's rotation, and that is having all pasture. Mr. Macpherson has had the advantage of living in one of the most fertile spots in Ontario.

A **Member**: I notice Dr. Rutherford has spoken from a veterinary standpoint, and Prof. Dean from a practical standpoint, and I would like to ask when the professors differ what are we to do?

Dr. **Rutherford**: The gentlman is partly wrong. It is true that I am speaking from a veterinary standpoint, but I am speaking from a practical veterinary standpoint. (Applause.) As I said in my opening address, if you have one tuberculous animal in a stable that is so improperly ventilated, and it is to be maintained at a temperature of 50 degrees or 60 degrees without-artificial heat, the chances are 100 to 1, that every other animal in that stable will be afflicted with tuberculosis. (Applause.) Prof. Dean said he thought he had no tuberculosis on the farm. I remember when they had. If they had one tuberculous animal in that stable in which he maintains at 55 degrees without artificial heat he would very shortly have a whole lot more.

Prof. **Ruddick**: I think I have trouble enough in connection with the line of work in which I am interested. I believe the question of ventilation to be an important one. I am very glad this discussion has taken place, because I fully agree with all that has been said with regard to the importance of stable hygiene or ventilation. I am satisfied that if we had better conditions in the stables at this time of year we would have a better quality of milk, and many of our troubles in the dairy business would be removed. I believe a great deal of milk is spoiled on account of bad ventilation in stables.

Prof. **Dean**: I would like to ask Dr. Rutherford why he thinks tuberculosis would multiply or increase in a stable at 55 degrees at a much greater rate than in a stable at 40 degrees.

Dr. **Rutherford**: That is a very reasonable question. In the same stable, with the same system of ventilation, you have one day a temperature of 55, and the next day a temperature of 40, dependent on the outside weather conditions. I would say that in my opinion the stables which is most frequently filled with fresh air, and has the very best ventilation, would be a stable at 40 degrees, of course depending on the temperature outside. When the temperature gets up above 40 outside we are not troubled about ventilating, because we open the doors and windows. In the northwest, the temperature runs down to thirty and forty degrees below zero, and it is quite a problem to ventilate the stables. A horse standing in the open, requires 100 cubic feet of air per hour. Put him in a stable, and you require to put into that stable about 15,000 cubic feet of air in order to give him his 100 cubic feet of pure air per hour, and his necessary supply of oxygen. If you could have followed me through the stables of England and Scotland you would not wonder at my being a little bit of a crank on a subject of this kind, and more especially if you had gone into the stables of the Icelanders of Winnipeg who were supplying women and children with milk. There we found the stables banked up with manure, every crevice stopped up, and the weather outside 38 or 48 degrees below zero, with the stables from 50 to 70 degrees inside, and 55 per cent. of the cows having tuberculosis. That is the condition in Winnipeg, and that is the reason I am a crank. (Applause.) I do not think there is any doubt there would be very much less risk in a stable at a low temperature than a stable with a temperature of 55 degrees. In spite of all the insinuations, Prof. Dean and I think a great deal of each other, and have mutual respect for each other's opinion.

The **Chairman**: I think these last twenty or twenty-five minutes have been the best meeting we have had. I am delighted with the discussion that has taken place. I sleep with my window open and just look at me. (Laughter and applause.) I want ventilation, and I have no sympathy with these people who build expensive barns with 7x8 windows on each side, and shove their cows into what I call a root house with blue mould on the side of the walls, and then expect them to do the best services for them. I would build an "L" shaped barn, wood, lined with paper, and I would have it warm and well ventilated. Some people will buy a thousand dollar cow and shove her into one of these poorly ventilated stables, and then wonder why she is not up to perfection.

COMMITTEES.

The following committees were then appointed:

Business: J. R. Ruddick, John R. Reid, R. B. Faith, R. G. Murphy.

Nominations: J. R. Dargavel, M.P.P., Edward Kidd, James Whitton.

Legislation: D. Derbyshire, M.P., John R. Dargavel, M.P.P., Henry Glendinning, G. G. Publow.

Resolutions: R. G. Murphy, John R. Reid, L. Patton, T. B Carlaw.

ADDRESS TO THE GOVERNOR-GENERAL.

His Excellency, the Governor-General, was to have been present at the evening session, but, owing to illness, he was unable to attend. He was represented, however, by his Military Secretary, Hon. Colonel Hanbury-Williams. There was a large attendance, and a splendid musical programme was rendered during the evening.

The Chairman: We regret exceedingly that we have just got word from the Governor that he is ill in bed, but he has sent in his stead, his Military Secretary, the Hon. Col. Hanbury-Williams, who is here on the plantform, to convey his wishes to this Association. We regret that the Governor is ill, but we are glad that Colonel Hanbury-Williams has honored us with his presence here to-night, and will convey our wishes to the Governor-General as expressed in the following address:

To His Excellency, the Right Honorable Earl Grey, Governor-General of the Dominion of Canada:

May it please Your Excellency. We, the officers and members of the Eastern Ontario Dairymen's Association, desire to express to you our hearty appreciation of the great honor you have conferred upon us by consenting to open this, the first Dairymen's Convention held in the capital city of Canada since you came amongst us as Governor-General of the country, of which we are all so proud and love so dearly. We appreciate the honor you are conferring up us.

We feel much gratified that an English nobleman of high rank and position, and the bearer of a name so well known in the history of theMotherland, should be willing to devote his talents and energies to the service of our Dominion, and thus to add one more strand to that unbreakable cord of love and gratitude which binds us to the old land across the ocean. As dairymen and citizens of this fair Dominion, we attest our loyalty and devotion to the Empire and to the person of His Gracious Majesty, King Edward VII., and to you, his representative.

We have noticed with much pleasure the great interest you have taken in all that concerns the welfare of Canada, and we are glad, indeed, to have you brought into close contact with the men who are engaged in what we believe to be the greatest industry in our country.

This Association is endeavoring to further the success of this important industry, by the holding of conventions and local dairy meetings, at which addresses are delivered by experts, discussion encouraged and means devised, by which we may be able to maintain the proud position we now hold, in supplying the British market with the largest share of her imported dairy products.

Again, allow us to say, that we appreciate your kindness in thus being present, and our sincere desire is that your Excellency will become an Honorary Member of our Association.

We all, most sincerely wish Your Excellency the compliments of the season, and trust that your stay in Canada will extend over many more years, and that they may be fraught with much happiness. On behalf of the Associations,

D. Derbyshire, President.
R. G. Murphy, Secretary.

I beg you to present this to His Excellency, the Governor-General, with the kindest regards of this Association, and at the same time, request him to become an Honorary Member of the Association, and present him with the badge I have already furnished you.

Colonel Hanbury-Williams: I regret extremely, that His Excellency is unable to be here to-night, but he was laid up this morning with a feverish attack of cold, and it is quite impossible for him to come, and he has asked me to convey to you and the Association, his best wishes for its success. He is well aware of the work that it is doing, and it is a work, in which he takes the greatest possible interest. He hopes that at your next meeting he will personally be able to be with you. I, as Military Secretary, have a great many and various duties to perform in Canada. I have among other things, to bow thirteen times at each meeting of Parliament, and the other night, I had to perform at theatricals as a ghost. Well, to-night, I am the ghost of His Excellency. (Laughter and applause.) I should have been only too glad as his ghost, to have made you the excellent speech which I know he would have made if he had been present. Unfortunately, His Excellency forgot, when he sent me to act this part, to provide me with what we call in theatrical parlance, a "Book of the Words." Therefore, I have no book of the words to read to you, but I do convey to you most heartily, his sincerest wishes for your success. (Applause.)

COW-TESTING A DAIRY REQUISITE.

By Hon. Sydney Fisher, Minister of Agriculture, Ottawa.

After expressing regret at the absence through illness of Earl Grey, and complimenting the Association upon the fact that its President was a member of the House of Commons, now in session at Ottawa, the speaker proceeded to say:

You are here to discuss dairy problems, and I would like to say a few words to you in regard to these subjects. I have always maintained that wherever dairying is the basis and the chief factor in agriculture, there you will find prosperity. (Applause.)

One of the most excellent examples of the agricultural progress to-day is the little country of Denmark, and if you look into other countries like Switzerland and Sweden, and the New England States, and the great States of New York and Wisconsin, where the dairying industry is carried to the highest perfection in the Union, you will find these States the most prosperous, and their prosperity is the most sure, the most constant, and best founded of any industry.

Under these circumstances, I need not enlarge on the value of dairying to the people and to the country. The fact that we exported last year nearly fifty million dollars worth of dairy products and bacon, which are subsidiary to the dairy products, and that in Canada altogether the production of dairy and allied products came to over $100,000,000, ought to be very convincing. In addition to the great prosperity and material advantage of dairying, there is a greater advantage in its being the highest development of the agricultural character of the people. There is no branch of agricultural industry in which skill and intelligence is so absolutely and to such a great extent required; therefore, I believe it to be one reason that the dairymen of Canada are the most intelligent farmers of Canada. Farming in its crude sense is somewhat of a drudgery. I say frankly that a man cannot be a good farmer in Canada unless he is a worker, and I am proud of the fact, because I am also glad to know that the Canadian people as a people are workers, and the more they are workers the better men they are.

I want the farmers of this country to be workers with their brains and intelligence more than workers with their hands, and if he can use his brains and his intelligence effectively and well, the work of his hands will be better, and he will be more skilful with his fingers, and the better handicrafts man, and the better citizen. A few years ago a simple mechanical test was found for gauging the richness of milk. I allude to the Babcock test. The discovery of that test revolutionized dairying, because by that test we are able to immediately find out the quality of what we are producing. We are not content to-day to know how many pounds of milk our cows produce, we are not content to-day to divide our profits at the factories simply by the number of pounds that the man brings in, but we want to know if it contains all the milk that our cows produce, and we want to know how much butter fat the man brings to our factory. I daresay some of you will know that I am not speaking of every factory in the land, because I regret to say that there are a great many of our factories that do not yet pay by the test.

I want to say a few words regarding what we call cow-testing. I consider this, not a discovery or invention, as was that of Dr. Babcock, but it is a practical application of just the same kind of work and thought that brought about the discovery of the Babcock test. The Babcock test came to us from the Western States of America, and the cow-census also came to us from the Western States of America. The idea was given to our dairy world by our old and dear friend, Ex-Governor Hoard, of Wisconsin, who instituted a cow-census among the factories of Wisconsin many years ago, and the result has been an increase of dollars and cents in his pocket. He tried to find out why it was that some men sent in 4,000 or 5,000 pounds of milk per cow, and other men only sent in 2,000 or 3,000 pounds of milk, and how it was that some cows he knew were supplying to his factory 8,000 to 10,000 pounds of milk in a season, and other cows with nearly the same treatment were only delivering to his factory 3,000 to 4,000 pounds of milk in the year. He got his patrons to investigate their individual cows. He began by investigating herds. In many instances it was found that certain animals were giving double what other animals were giving under the same treatment, in the same stables, the same pasture and the same management. The result has been an enormous increase in the annual production per head in the cows of that state. What we require in Canada is that all the cows that are kept by our farmers should be increased from 25 to 50 per cent. in their annual production of milk.

We were shown this morning that we exported last year over $30,000,000 worth of butter and cheese, and that in Canada we consume probably $55,-

000,000 worth of milk, butter and cheese, and I venture to say that at the very least, 25 per cent. can be added to that production within three years, if cow testing associations were general all over dairy districts of the Dominion. (Hear, hear.) That would mean that our dairymen would have, instead of $80,000,000 worth of milk, butter and cheese, over $100,000,000 worth.

There is no doubt a vast improvement can be made by scientific breeding and selection of our dairy stock, and the other side of the question is actual care in the management of the cattle. I am a dairyman myself, and a few years ago I was fortunate enough to be home for a few years without any distraction of political and other inferior life, (applause and laughter), and I was able to attend to my dairy alone. I had a herd of about twenty cows, and after two or three years testing of the individual cows, in the year before I became Minister of Agriculture, my herd produced three hundred odd pounds of butter for each cow. This is nothing very great. I do not boast of it in any way; it was a good fair yield. I joined the cow testing association in Cowansville and the Eastern Townships this last season. I asked my foreman to test the cows under the rules of that cow-testing association. It is ten years since I looked after them myself. Ten years since my cows made over 300 pounds of butter in the year. This year, according to the test, they averaged in nine months a little under 175 pounds of butter fat, or less than 200 pounds of butter in the year. That is to say, after ten years of disregard of testing, with the same class of animals, they have gone down from 300 to 200 pounds of butter in the year. They are nearly all thoroughbreds; they are just as good individually as my animals were ten years ago. Some of the thoroughbreds are at the head of the list, and some of them are at the foot of the list, and I would like to say that while thoroughbreds are, *prima facie,* likely to be better workers than the grade animals, the fact that the animal is registered as thoroughbred is no conclusive proof that it is a good working dairy cow. I speak with regard to all the breeds. I believe it is just as necessary that we should have this work, which is now being started in Canada, under the auspices of the various thoroughbred associations for what is called advanced registry of thoroughbred and registered animals, as it is for us to have cow-testing associations which will deal with all individuals whatever may be their breed. Well bred, well chosen thoroughbred stock must be the foundation of our stock, but to accept individuals which happen to register without examination of their performance and without thoroughly considering other facts and using these animals to be the basis of our dairy herds, is a great mistake. I know that thoroughbred sires of well chosen dairy breeds, and well chosen individual sires, are absolutely necessary for the improvement of the dairy stock, but to select the thoroughbred sire without knowing anything about the performance of his fore-bears, or about him in his individual character, is simply folly, and you might almost just as well take a scrub. At the present time, we have sixteen cow-testing associations in Canada, and I want to tell you, gentlemen of Ontario, that thirteen of these are in Quebec, and it behoves the Ontario men to look to their laurels, or the Quebec men will get ahead of you, as they have already got ahead of you in butter production. I hope to see thirty cow-testing associations in Ontario in the near future. I am satisfied it is one of the most important features for the improvement of dairying.

Intensive cultivation of the soil in this country is extremely lacking, and I believe intensive working of the cows in this country is also extremely lacking, and if you are going to increase the dairy products and swell these magnificent figures higher and higher, cow-testing is the most profitable, the most intelligent, and most skilful way in which to do it.

I regret that I was unable to be present throughout all the discussions of to-day. I hope to-morrow to be able to attend your meeting, and if I am not present it will be because my duties in the House of Commons absolutely require my services. (Applause.)

The President: I am sure we are delighted with the inspiring address of our Minister of Agriculture, and I am sure he will look after us even better in 1907 than he did in 1906. He gave us better transportation and better facilities for getting our goods to the British market, and in giving us these cow-testing associations, he has made a good step in advance. Quebec can never beat Ontario; don't worry about that. They can never do it in the world. (Great applause.)

Mr. D'Arcy Scott, Mayor-elect, was introduced, and cordially welcomed the association to Ottawa.

CONTRIBUTORS TO DAIRY ADVANCEMENT.

By G. C. Creelman, President Ontario Agricultural College, Guelph.

I appreciate to the fullest extent the invitation which has been again extended to me to again come here, not as a professor, because I have nothing to profess, and not as President of the Agricultural College altogether, but as a member of the Eastern Dairymen's Association. I thank the President and Directors for inviting me for the fifth time to address this Association. How you have grown. It is not so long ago that you could drive almost all day between cheese factories in Eastern Ontario, and to-day there are places in Ontario, where in a ten-mile drive, you will pass from ten to twelve factories, and your product in the British market leads the way. (Applause.)

I congratulate the dairymen of this Eastern Association in the matter of improved products, and in the improvement of your individual factories. As I go from county to county and township to township, and go into these factories and see the improvement that has been made upon them, I can realize that great work has been done by this Association. I congratulate you because you realize now that the business of dairying, the business of cheese-making, and the business of butter-making is a profession in itself in which there is just as much to be learned from day to day, and from year to year, and just as much opportunity for the development of the grey matter in your heads as in any of the so-called higher professions. This has not been brought about during a life time, but within the last few years, even during your term of office, Mr. President, and because of this increase in the dairy business there has been great increase in land values in Eastern Ontario, quite a great increase in the prosperity of the farmers of this country. I can remember, however, that when you first took the chair you made a statement that you believed so sincerely in the future that you believed the time would come when land down in your county which was then worth $10, $11, and $12 per acre in many places would be worth $25 an acre. I would hate to-night to offer the first farmer I met less than $50 or $75 an acre for the same land on which in those days they were endeavoring to produce crops, for under the rule of the cow that land has doubled and trebled and quadrupled in value, and this Association has to be congratulated to the fullest extent for the part which they have taken in bringing about this result.

I would like to mention the names of five men, yet living, and yet active in the work, who along with many others whom I have not time to mention, have contributed, in my opinion, most to this great movement. These men are yet living, and before we come to write their names upon the tombstones, and stand and read good things about them, and take up the newspapers and magazines and read about the good things they have done, I think that we can give them full measure of praise while they are living. The names I would like to mention are:—Sydney Fisher, J. W. Robertson, John Dryden, Nelson Monteith, and J. A. Ruddick. (Applause.) The farmers have done their part. You know your factory and you know your creamery, and these representative people in Parliament, in the Local Legislature, and at Farmers' Institute meetings. In season and out of season, these men have stood to the front, and have dignified the profession of agriculture and the profession of dairying, and it is my pleasant duty to single out of these five men and mention them here to-night. (Applause.)

Another point that occurs to me that has assisted in this general prosperity, is our dairy schools. The Eastern School at Kingston has done a lot of good in Eastern Ontario. When Mr. Ruddick undertook the management of that school, under the direction of the Ontario Department of Agriculture, and with the sympathy of the Board of Directors of this Association, some people in this part of Ontario said, "What can a young man like that come and tell us? What can he, with a staff of young fellows, tell us about making butter and cheese?" He had the active sympathy of the members of this Board, and the school was a success. The men who are going to succeed in this business ought to attend two or more sessions.

Another thing which has contributed greatly to the dairy industry in this country was the McKinley tariff. You remember how you cursed that tariff when it was first brought out, and how the politicians said the country was ruined. We said the McKinley tariff was going to be a curse to this country, and our farmers would have to go out of business; but their superior intelligence and industry and that peculiar breeding which belongs to the average Canadian turned to another direction, and approached the great markets of the British Empire, with the result that you already know. (Applause.)

When McKinley made 60c. wheat, the people said, "We are ruined." For two or three years, the mortgages increased, interest rates were high, and quite a few moved off to the United States because they believed there was no future for them in this country. Under these adverse conditions our farmers turned from grain to dairying which was the agricultural salvation of this eastern part of Ontario. (Applause.)

The people of the United States appreciate the young men from the farm for three things: 1st, their general intelligence and the quickness with which they adapt themselves to new conditions; 2nd, their untiring industry, having been used to hard work always on the farm at home; and 3rd, for their superior morals in the general way of taking care of themselves and not being given to frivolity or any kind of intemperance. So long as our young men on the Canadian farms are industrious, and so long as they have the integrity and intelligence in business that they have shown in the past, I think we have no fear for the future as to farm conditions and the dairy industry in this eastern part of Ontario.

What about the future? It is well enough for me to stand here and talk in an optimistic mood in this way, and say "We are the people, and wisdom will die with us." What of the future? Have we got to the end of our tether, and are we ready to sit down and ask the Supreme Being to say to us, "Well done, good and faithful servant, enter thou into the joy of thy Lord?" or shall we say, "We have been faithful over a few things, now make us ruler over a great many things, that we may bring the dairy business up to what it might be." I am not much at quoting scripture, but I think I can go one more, and say that it may be that the finger is pointing at us and saying to us, "Go out into the world and preach the gospel of good dairying to all the people."

As you are especially a dairy convention, may I be permitted to point out two or three things that in my opinion the cheese-maker and the butter-maker at the present time have to watch very carefully, if they are going to continue to make good cheese and butter, because the people on the other side of the line, and on the other side of the water, are watching us. Hardly a week goes by that I do not get letters from the Old Country or the United States, asking it I could not recommend a young man from the Eastern or Western Dairy School. (Applause.) So they are after us, and we have got to go on and improve and make better butter and better cheese. We have got to bring it up to the highest standard, if we are going to retain the lead. There are, perhaps, many successful men in this world who do not read very much, but the day has gone by, when the cheese-maker can afford not to be a reading man; he has got to fall behind in the race unless he keeps himself up in principles of dairying.

The Canadian Dairyman is the only paper especially devoted to dairying in Canada. It now comes out in a new form; it is edited by one of your Eastern men, Mr. H. B. Cowan. (Applause.) I am not advertising the management, or getting paid for it, but it is the only dairy paper in the Province of Ontario, and there is no reason why every cheese-maker and every man engaged in the dairy business, should not have this paper in his home. There are other agricultural papers that are good, but I feel obliged to say this word in favor of this new paper. A man must not only read, but he must become a close observer. If you are not a close observer, your reading will become pure theory. The practical up-to-date dairyman must also experiment. It is for you who have the situation in your own hands to try to do things and observe them in your factory. Try them, even if you spoil a horn occasionally in trying to make a spoon. I would like the word "experiment" to become a common word on our farms. I want you to realize how you could conduct your own experiments. In the month of June last year, I passed through what we call the experimental fields on the Farm at Guelph, and I noticed a beautiful field of barley, as even as any field I ever saw. Every head seemed to be just about as high as every other head, and as the gentle breeze touched it, it was just a little wave, and looked like a perfect field of grain, and the whole field came up to just as you intended it to be. I remarked to Mr. Buchanan, "Why is that piece of barley so much more even than the other"? and he said, "I am glad you asked me that question, because you have noticed it, it will be noticed by other people. We have demonstrated by experiment that if we take the large grains and the sound grains from a bushel of wheat, and plant them by themselves, we will get a larger and better and stronger crop than if we plant them just as we bring them from the granary. We have gone further, and that field of barley came from one grain of barley two years ago. Two years ago we planted one grain of barley, and from that we got one thousand and forty grains. We took out forty or fifty grains and planted the rest, and we got two bushels from that. We took out one-half gallon and sowed the rest, and this field of barley is the result, and he said "I expect that field will give me ten bushel per acre more than ordinary good seed. That work could be done in one evening by any farmer, by picking out the best seeds.'' And I said "That is pretty good business.''

The same with strawberry culture. They are having wonderful results by selecting the best plants.

Prof. Dean spoke of one cow of the herd that produced over 11,000 pounds of milk, and another cow in the same herd, and that is not a mean herd, produced over 4,000 pounds, and the average of the Province of Ontario is only 3,000 pounds, and I leave it with you just as a problem to be worked out. Is it not the duty of the farmers of the Province of Ontario to drive that stigma away from us, and by these cow-testing associations raise the standard of our cows just a little higher, and get the average production of the Province of Ontario a great deal higher than it is. (Applause.)

ADDRESS.

By Hon. Nelson Monteith, Minister of Agriculture, Toronto.

You have been having such a feast of reason, that it is almost a pity that a plain country chap should worry you to-night. When your President invited me to be present with you at your convention in Ottawa, I felt it a privilege, an honor, and a duty to come among you and see what you were doing in the Eastern end of the Province. It has not been my good fortune to mingle with the men of the eastern portion of the Province as much as I have with the men of the West. However, I have always found that the dairymen of Eastern Ontario generally had a fair idea of what they wanted when they came up to discuss matters of finance at Toronto. They had their plans fairly well digested before they brought them before us, and their demands were fairly moderate. I trust the good fortune that has fallen upon the people of Ontario in the Northern portion of it, will not make your demands too exacting in the future.

We are here to-night in this beautiful city of Ottawa, the capital of the Dominion, which we, as Canadians are justly proud of. We are proud of your prosperity, and that you have set about to make this the most beautiful city in Canada. You have great ambition, and I hope you will not get weary in well doing along that line.

I am not a man of words, but I have attempted to be a man of action, whether on the farm, or in public service. We have here with us to-night, a fair representation of the leaders of agriculture in Eastern Ontario. I see a great many men here, whose heads are beginning to show the tint of age, and also a great many young men in the vigor of life, and with the courage and boldness of youth. We have much to learn from the older men; they have had the duty upon them of being pioneers. Alas, two few of those who bore the strenuous trials of the early pioneer life, remain with us, but we have men of middle age who know the trials of agriculture in this great Province of Ontario. We do not know what difficulties are to-day, as compared with the difficulties under which they labored. Nevertheless we have a struggle in the keen competition that is abroad throughout the whole world, and we have to bring this great heritage that has been left us by those who preceded, to that standard of nationhood and citizenship, in order that our influence may exist far beyond the borders of the land we so dearly love. We who have had the good fortune to be born and reared in a climate whose vigors demand a struggle for existence have in our make-up those elements that have ever ruled the world physically and mentally.

Take if you like, the countries of Europe, and I believe we bid fair to demonstrate that same truth on the continent of America. With all due respect to our American cousins to the south of us, I trust that we will hold stronger to the virtues of humanity than possible they have in many lines. We have here, in the Province of Ontario, fine resources, not limited to agriculture alone, but in mines and forests, the latter of which you at Ottawa have such intimate knowledge. In days gone by, your forests were the pride of Canada, I may say, almost of the British Empire, the forests of the Ottawa Valley. They have been vanquished to a great extent, and we are now more and more dependent on their inexhaustible supply of fertility that lies within the bounds of our agricultural area.

I believe I speak a word of some prophecy, when I say that the time will come when, instead of our speaking of Ontario East and West, we may speak of it North and South, because the Northlands are being peopled rapidly, and we have there a vast area of agricultural lands, and in the not distant future, these lands will be the home of millions, and that is not a dream. We as Canadians having a desire to make this great Dominion what we believe it was destined to be, have a great duty devolving upon us, to see to it that the great connecting link of Northern Ontario be filled with people to bind the west and the east in common interest, and I believe it is through the development of agriculture that that must be brought about. While many of our young men are turning their faces to the west, I believe that they will find plenty for their ambitions that will amply reward them for their endeavor in Northern Ontario.

It has been my good fortune to have been reared on a farm, and to be in close and sympathetic touch with the conditions of farm life, and my sympathy goes out to the men and women who make up our rural populations, more especially so when I see them gathered under comfortable conditions such as I see here to-night. I regret that the great mass of the people cannot be reached in this way for instance, the man on the back concession whose surroundings may be humble. I regret that we cannot bring the truths that have been so well spoken here home to him, in order that he may take new inspiration, and feel that after all, life is not merely a struggle with no object in view. I spoke to your instructors upon that subject a year or two ago. I feel that one of the greatest missions the instructors had, was not only to instruct the cheese-maker how to make cheese and butter, but to go out among the farmers, and meet them in their own homes, talk with them and make them feel that after all they were part of this great co-operation upon which we are all so dependent. Teach them that after all "No man liveth to himself," that we are all interested in this great dairy industry, that it must work smoothly, and that the products of this country, this Canada of ours, may attain a higher degree of perfection than they have yet attained.

The inspiration of such men as have addressed you here to-day on the technique of the dairy industry, helps us on. The great masses do not read what is in our press, and what is disseminated through our agricultural journals, and all these are mighty factors in the education of this nation. There are a great many farmers who are merely existing in their homes; they take no interest in reading of the affairs of the country and keeping in touch with the events that are transpiring around them. These are the men that the instructors should aim to reach, and try to raise them to a higher standard of citizenship.

I might speak at some length of what we are trying to do in Toronto through the staff of instructors and professors. We are not forgetful that

"Money makes the mare go," as the saying is. We believe that money can be judiciously spent in extending this great business, but I hope that it may never come when money may be given by the Government for the sake of giving. I feel that so long as money can be given to advance this cause, the money will be given gladly and freely. We are proud of the men engaged in this business; they have shown loyalty to our Department. I know the difficulties that they are up against, but I believe as time goes on they will be better appreciated by the people. I hope that your convention will be well attended, and that the knowledge and interest that they manifested to-day will be maintained to the end, and that you will all go home profited by coming together at this splendid convention.

The CHAIRMAN: Our good friend, the Minister of Agriculture, gave us twenty-eight instructors this year; two Sanitary Inspectors, and our Chief Inspector, Mr. Publow. We feel proud of him for doing these things, and while we had 740 factories out of 1,000 under the management of these men, next year we expect that he will give a few more instructors, and make these all Sanitary Inspectors, so that we can make all these factories come in. Every man that is a maker of cheese has got to come into this syndicate some day; and we will have these inspectors not only help the factories but help the farmers as well. Our good friend, the Hon. Mr. Fisher, has given us better transportation facilities, and that is one reason why we got better prices than the year before; because our goods were delivered in better condition. It is our business to keep them guessing for 1907, and we will do it.

I would like to have our old friend Dr. Mills pronounce the benediction before we close. (Laughter and applause.)

Dr. MILLS, Ex-President Ontario Agricultural College: I need scarcely say that I am gratified to see Mr. Derbyshire still in the chair he has occupied so long with so much enthusiasm and ability. I have listened with much interest to what has been said by the Ministers of Agriculture, the Chairman, and the President of the College. I have felt for a good while that you have attained considerable degree of success in the way of instructing dairymen how to make butter and cheese, and in the caring and handling the goods after they are made. I think you have done well along this line, and I feel disposed to say what I think on another line. I do not think you are doing what you should towards reaching and improving the source of production. You may do what you will in the way of instructing men to care milk and cream after it reaches the factory, but if the people who supply the milk are not up to the standard then you will never have the very best article. If your milk is contaminated by filth and dirt, by disease producing bacteria from the stables before it reaches the factories, the most experienced men can never make the highest class of goods. I know what I am talking about; and I say it is a most serious thing that this matter has not been looked into, and I think it is a great pity that you are not reaching out and getting hold of the men that are supplying the milk to the factories. In Denmark every man that sells milk has to submit to the closest possible inspection of his premises. We ought to have that inspection in this country for the health of the grown people and the children. (Applause.) I think that you should add that to your cow-testing. I agree that they should do as the Minister said on the importance of testing cows and sending to the butcher those that do not pay their way. (Applause.)

The CHAIRMAN: That was a wise stroke to ask him to come up. You know that I knew what was in his head. We are going to have more inspectors, and factories will be sanitarily inspected. We are going into every factory and farm, and make them clean up or shut up. (Applause.)

HIGH CLASS DAIRYING.

By G. A. Putnam, Director of Dairy Instruction, Toronto.

It gives me a great deal of pleasure, indeed, to come before the Dairymen of Eastern Ontario, because when I come before the dairymen, I come before the representatives of the largest industry, by far, along agricultural lines. I have wondered what Eastern Ontario would be were it not for the Dairy Industry. This was referred to yesterday by President Creelman. He stated that land values had been doubled, tripled, and quadrupled as a result of the introduction of dairying.

I wish first to say a few words as to the work of the Department of Agriculture of Ontario. Many of you possibly are not aware of the efforts that are being put forth by the Department and the money which is being expended, irrespective of the work which is being done at the Agricultural College, where they spend a good deal of money, and do a lot of most effective work that is of great benefit to the dairymen of the Province. In addition to that, the Provincial Department spend something like $51,000 directly in the interests of the dairymen of the Province.

Mr. Barr is chief dairy instructor in the West, and he is also Superintendent of the Dairy School and Secretary of the Association, and I am sorry he is not here to tell you of the conditions in the West. The factorymen in the West are in somewhat better position than the factorymen in the East, for the reason that the factories are larger, and the individual dairymen in the West keeps a larger number of cows.

I was very pleased last night to hear Dr. Mills, whom I look upon as my father instructor in agriculture, state that the chief work to be done in connection with the dairy business is to do something effective by way of inducing the producers of milk to deliver to the factories clean milk, properly cooled.

The Women's Institutes of Ontario now comprise 400 organizations with a membership of nearly 11,000, and they are doing an excellent work in building up the home conditions of this country. When we have the mothers and daughters consulting together as to what they can do to make the homes on the farm more attractive, we will have improved conditions, and the boys and girls will be induced to remain on the farm. When we have 400 organizations making for one definite object, we can rest assured that it is bound to tell on the future of this country. At the Women's Institute Convention, held in Guelph in December, one session was devoted to the subject of milk, and Professor Dean gave a most excellent address on the production of milk, Miss Shuttleworth on the care of milk, and Dr. Helen MacMurchy spoke from a doctor's stand-point. Dr. MacMurchy stated that an infant raised upon the average milk which you get in the city has one chance out of fifteen to reach maturity, as compared with an infant which is raised in the natural way by suckling its mother. This is due largely to the lack of care in the handling of milk and neglect of properly cooling it. This shows the danger which infants are subject to in drinking milk which is sold in the average city of the Province. I think it is high time that some Government regulations were adopted by which the supply of milk should be inspected, as well as the farms on which it is produced.

We hear a great deal as to the lack of care in handling milk, by the producer. We accuse the farmers of being uncleanly in their methods. But there is another side to the story. We all know that it is very difficult to get efficient labor upon the farm, and farmers work a great many more hours than the average city man, and my sympathy goes out to them. I admit that they do follow rather uncleanly methods, but it is difficult for them to adopt what we would call cleanly methods in the production of milk. Many of them do not realize what cleanliness means so far as dairying is concerned, and many of those who do have had no time to put the advanced methods into practice; a few on the other hand, have no inclination to put into practice the knowledge which they have. If you say to the average men from the farm "Why don't you take off that coat and the trousers which you have been working in all day, put on clean outer garments and wash your hands before you start to milk the cows"? he would laugh at you and likely reply, "I have to wash after I get through; what is use of washing now"?

I trust that we may be able to so arrange the instruction work this year that every farmer will be visited, not with the object of demanding that the farmers do this and that, but to reason with them and to show them that it would be a monetary gain to them to take proper care of their milk; that they would get an increased yield of cheese, which would more than repay them for the increased work which they find necessary in adopting these cleanly methods, and after all it would not require much additional work on the part of the farmers.

We do not recommend what might be termed extreme methods such as are adopted in some of the larger dairies where milk is produced for a special trade. What we require is only ordinary care and cleanliness in methods. May I refer to a firm near Toronto, which is now selling milk produced upon their own farm, and which is put up in a special form. The stables where this milk is procured, are swept out carefully every day, the cows are well groomed, the food is brought in from another building. The walls are mostly of glass, and there is provision for abundance of fresh air and light. That milk is sold for 12c. a quart, and they have no difficulty in selling all they can produce. Why do not some of our factories and creameries aim to produce a superior article for a fancy trade?

Last year the instructors were furnished with sheets upon which were printed some instructions as to the care of milk, the care of the cattle and utensils, and the necessity for keeping the milk clean and cool. If we can get the farmers of this Province to take the care that is necessary in producing milk, many of the troubles which we hear so much of, would disappear. If we could go to Prince Edward County and visit the farms where they are taking good care of their milk, and where they have put up special milk houses, I do not think you would hear much complaining on the part of proprietors and makers. For many years past we have spent money upon the work of instruction, and the instructors have done their work faithfully and well, and we have been gaining ground. Still there are 275 factories that have not yet been brought into the fold, and it appears to me that it will take some years along the old lines to get many of these factories to come into a syndicate for instruction, and there are a number of them which you will never get. Small factorymen, and the factoryman who does not realize the necessity for up-to-date methods, you will never get; and if you do not get him, how are you going to be assured that the average quality of the cheese shipped from the country will be raised?

I trust your Association will make a strong representation to the Department, recommending some method by which these factories can be brought under instruction work. I feel sure that if they were charged $50 a factory next year and the following year, that the benefit accruing to the dairymen of this country, by having all the cheese brought up to a certain standard, would more than repay each for the money they had been asked to pay for instruction. We must get at these factories which are away down low in the scale.

The CHAIRMAN: Mr. Putnam did not know I was going to call on him, out he did well. I put him right up here without having any notice, and he has made a nice up-to-date address. It does seem to me that I would produce that 12c milk. We sell milk in Brockville for 5 and 6c a quart, and I believe I could get 400 customers that would give 12c. if they could get it from an absolutely clean stable, and if they could get milk that was absolutely pure, from healthy animals that were kept clean and healthy, and given pure water to drink. If you could get absolutely an advanced quality of milk you could sell it at any price you might like to ask. Customers in New York City to-day, go out in the country and look over the herds themselves, and make their bargain for the milk, and they are ready to pay twice what the ordinary man asks for his milk. We have had the assistance and co-operation of Mr. Putnam, throughout the year. He has aided us in every possible way, and we feel proud of the work he has done, and we feel proud of the work Mr. Publow has done. He has had an able staff of twenty-eight Instructors, and two Sanitary Inspectors under him, who have been doing efficient work. There is going to be no guessing about what is done in 1907. We are going to raise the standard of the quality of our cheese. If you have a little factory sticking in the mud, it hinders every other factory in the country. Another thing, that I lose my temper over is when I see cheesemakers trying to struggle with the milk when it is impossible to make fine stuff. It is not fair, it is not honest, and I tell you we want the men on the farm to have some of this responsibility. Next year, we are going to have as many more Instructors as the Minister of Agriculture for this Province will give us. We are going to have more; we know that now. (Applause.) We are going to have these men go from factory to factory and farm to farm, and talk in a nice way to these people, and show them their responsibility, and we are going to have everything connected in one solid chain. If you have one weak link the whole chain is no good; we must have all working together for the best interest of this industry, and raise the standard higher this year than it has ever been in the history of the world.

DAIRY INSPECTION.

BY G. G. PUBLOW, CHIEF DAIRY INSPECTOR, KINGSTON.

It is with pleasure that I present to you my fourth annual report as Chief Dairy Instructor for Eastern Ontario.

The work of instruction was carried on in a similar manner to the methods followed in the previous year, and so the general outline of my report cannot be changed very much.

Owing to the fact that is is optional with the factorymen whether they employ an instructor or not, a circular letter and application form had to be sent to each one some time before the manufacturing season opened. Seven hundred and twenty-seven of those who made application were given the service of an instructor, but a great many have failed to send in their applications until all the territory had been divided, and consequently they could not be placed in any of the groups. This system of applying for in struction is a very great drawback to me in arranging my work in the spring, as I never can tell just how many want an instructor, nor can I tell just how many instructors I will require. I would, then, like to suggest, that when the Department is arranging the work of the coming season, they would make some provision that would make it definitely known to me just how many factories we would have to reach. If this were done we would have more time for the selection of the men, and the territory could be more carefully divided, so that some of the instructors could visit a larger number of factories.

The 727 factories regularly visited was an increase of 77 from the year before. To reach these, two more instructors had to be engaged, making a total of twenty-eight.

The new sections were covered by the Vankleek Hill group under charge of Mr. Claude Ferguson, and the Plantagenet group under Mr. Joseph Charbonneau. Our best instructors seem to be the men to whom a great many of the new openings in the dairy work are being offered, and every spring some of our instructors leave the road to accept more lucrative positions.

It was with regret last spring when we were asked to accept the resignations of Instructors Thompson, Echlin, and Publow, who had received these offers.

The positions made vacant by these resignations were filled by Messrs. Herity, Gardner, and Brintnell, all of whom did good work; but I would like to recommend that a substantial increase of salary be given our instructors, for it is very important that we should keep our best and most experienced men in the work of instruction.

As has been the custom, the instructors spent a ten day course of instruction at the Kingston Dairy School before starting their work, and before they left the school, most of the territory was divided into their respective groups.

Rather than individualize the work done in each syndicate, I have prepared a statement which gives the names of the factories in each group, together with a summary of the work accomplished by each instructor.

Alexandria Syndicate: A. McDonell, Instructor.

Union, Central, Glengarry, Aberdeen, Glen Robertson, Beaver Creek, Lorne, Dornie, Greenfield Union, Dominionville, Highland Chief, Heather Bloom, Fairview, General Roberts, Balmoral, Apple Hill No. 1, Apple Hill No. 2, H. L. 155, M. No. 1, M. No. 3, M. No. 6, M. No. 7, H. No. 47.

Almonte Syndicate: W. J. Ragsdale, Instructor.

Old Fairfield, Lone Star, Rideau Ferry, Rideau Queen, Mississippi Pride, Rosedale, Rosebank, Maple Valley, Appleton, Huntley Centre, Elm Dale, Rockspring, Pakenham, Roseville, Mayberry, Twin Elm, Montague Centre, Valley Queen, Black's Corners, Ashton Union, Island Queen, Crystal Springs, Irish Creek, Maple Leaf.

Bancroft Syndicate: Jas. Irwin, Instructor.

Walkerville, Ormsby, Limerick, Cashel, The Ridge, Chandos, Faraday, Lake View, Mayo and Carlew, Combermere, Beechmount, McClure, Greenview, Hybla, Bronson, Frazer Creek, Mayo and Raglan, Bangor.

Belleville Syndicate: H. Howey, Instructor.

Union, Foxboro, Eclipse, Melrose, Thurlow, Shannonville, Bayside, Sidney, Hallaway, Ketcheson, Bronk, Colborne, Zion, Silver Spring, Cedar Creek, Edville, Salem, King, Wicklow, Castleton, Rogers, Grafton, York, Brighton, Frankford, Mountain, Sidney Town Hall.

Brockville E. Syndicate: A. H. Wilson, Instructor.

Union Valley, Stanley, Star, Barlow, Palace, Glen Elb, Aberdeen, Leeds County, Miller's No. 2, Roebuck, Algonquin, Greenbush, Farmer's Choice, Oak Leaf, Union, Mount Zion, Garretton, North Augusta, Maple Grange, Willow, Maitland Union, Lee Hill, Minto, Farmersville, Glen Buell.

Brockville N. Syndicate: P. Nolan, Instructor.

Lake Opinicon, Salem, Black Lake, Green's 972, Farmer's Friend, Smith's Valley, Reliable, Dominion, Centreville, Seeley's Bay, Fermoy, Ideal, Plum Hollow, Elgin Model, Newbliss, Farmer's Pride, Cedar Bridge, Spring Vale, Willow No. 2, Island City No. 1, Island City No. 2, Crosby, Grand Central, Morton, Maple Grove, Lyndhurst, Cold Glen, Forfar, Clear Lake, Gilt Edge, Bush Model, Rockdale, Portland.

Brockville W. Syndicate: S. S. Cheetham, Instructor.

Morning Star, Thousand Island, Howe Island, Granite Hill, Jackson, Wilson, Maple Leaf, Central, Anglin, Pine Grove, Taylor, Springfield, Gem, Clover Hill, Woodburn, Gananoque Junction, Gananoque, Marble Rock, Lorne, Wilstead, Colebrook, Sand Bay, Long Point, Lansdowne, Tilley, Rockport, Springfield Union, Junetown, Caintown, Home.

Campbellford Syndicate: R. T. Gray, Instructor.

Trent Valley, Beaver, Prince of Wales, New Evergreen, Codrington, Norham, Burnley, Fenella, Rosemeath, New Model, Percy, Dartford, West Seymour, Beal, Forest, Rylestone, Stanwood, Empire, Kimberly, I. X. L., Woodlands, Crow Bay, Avon Bank, Trent Bridge, Round Lake, Victoria, Star, Brickley.

Chesterville Syndicate: L. A. Zufelt, Instructor.

Aults No. 1, Aults No. 2, Aults No. 3, Aults No. 4, Aults No. 5, White Globe No. 1, White Globe No. 2, White Globe No. 3, White Globe No. 4, McLean's No. 1, McLean's No. 2, McLean's No. 3, Goldfield, Grantley, Spruce Grove, W. P., Loraine No. 1, Connaught, Chesterville, Morewood, Smith's Hill, Ellis No. 1, Ellis No. 2, Inkerman.

Cornwall Syndicate: J. Buro, Instructor.

Lake View, May's Fancy, Moulinette, Black River, Glen Walter, Farmer's Choice, Glen Donald, North Branch, White Rose, Sweet Brier, McMillan's Corners, Strathmore, Sandringham, Moose Creek, Mayflower, Cornwall Gems, Dixon, Farmer's Joy No. 3, Lunenburg, Avonmore, Cornwall Creamery, Glencoe.

Kemptville Syndicate: D. M. Wilson, Instructor.

Reid's Mills, Robinson's, Suffels, Gravelton, Scott's, Oxford Mills, Kemptville No. 1, Patterson's Corners, Malakoff, North Gower, South Gower, Taylor's No. 3, Green Valley, Taylor's No. 808, Carsonby, Twin Elm, Goodstown, Kemptville No. 2, Vancamp, Hyndman's, Oxford Station, Farmer's Union, North Rideau, Francais No. 1, Maple Grove, Dawson, Olive Dale, Gordon Model.

Kingston Syndicate: Geo. Robinson, Instructor.

Cataraqui, Glenvale, Cold Spring, Sunbury, Battersea, Kellerville, Railton No. 1, Railton No. 2, Perth Road, Hartington, Reynold's No. 1, Reynold's No. 2, Reynold's No. 3, Forest, Latimer, H. B., Model, Cornflower, Arigan, Pine Hill, Rose Hill, Keenan & Sons, St. Lawrence, Gilt Edge, Ontario, Harrowsmith, Elginburg, Bear Creek, Elm Grove, Petworth.

Lancaster Syndicate: E. Wilkinson, Instructor.

Royal, Pine Hill, Glen Roy, Glen Norman, Glen Gordon, Bridge End, Picnic Grove, Glendale No. 2, Victoria, Glengarry Creams, Glendale No. 1, McGillivary's Bridge, King's Road, Bainsville, Banner No. 1, Banner No. 2, Currie Hill, Star No. 1, Glen Nevis, McLaughlin, Green Valley, Alpha.

Lindsay Syndicate: D. J. Cameron, Instructor.

Fleetwood, Ballyduff, Bensfort, Lang, Buckhorn, Myrtle, East Emily, Bobcaygeon, North Verulam, Reaboro, Mariposa, Dunsford, Maple Leaf, Omemee, Mount Pleasant, Cavanville, Crown, Cold Springs, Centretown, Spring Valley, North Ops, Palestine, Red Rock, North Harvey.

Madoc Syndicate: A. Herity, Inspector.

Victoria, Rock, Tweed, Stoco, Murphy, Bogart, White Lake, Alexander, Marble Springs, Cloyne, Kaladar, Boundary, Premier, Beulah, Madoc, Queensboro', Brook Valley, Spring Creek, Oak Leaf, Plainfield, Roblin, Clare River, Otter Creek, Eldorado, Roslin, Moira, Cedar, Moira Valley, Thomasburg.

Maxville Syndicate: R. A. Rothwell, Inspector.

Sunrise No. 1, Sunrise No. 2, Aberdeen No. 1, Baltic Corners, Echo, Farmer's Joy No. 1, Clover Side, Maplehurst, Newington, North Valley, Finch, McLean's No. 4, Berwick No. 1, Berwick No. 2, Co-Operative, Crysler, Red Clover, Cambridge No. 5, Farmer's Joy, St. Albert, Mayerville, Canadian Produce, Gold Leaf, Goldfield No. 5, R. C. & B. Asso'n, Midnight Sun No. 1, Midnight Sun No. 2, Midnight Sun No. 3, Midnight Sun No. 4, Midnight Sun No. 5.

Morrisburg Syndicate: C. W. Nowal, Instructor.

Edwards No. 1, Edwards No. 2, Edwards No. 3, Edwards No. 4, Edwards No. 5, Farran's Point, A. A. L. No. 1, A. 19, Elma, Bouck's Hill, Ashton's No. 1, Daisy, Mountain View, East Matilda, North Williamsburg, Model No. 1, Model No. 2, St. Lawrence, Matilda, Strathcona, F. F. No. 1, F. F. No. 2, McGregor, Matilda West, Mainsville, Maple Grove, B. C. No. 1, Mulloy's Gems, Colquhoun.

Napanee Syndicate: Geo. Bensley, Instructor.

Excelsior, U. E. L., Sillsville, Odessa, Metzler, Camden East, Newburgh, Selby, Kingsford, Forest Mills, Croyden, Centreville, Marlbank, Moneymore, Deseronto, Empey, Napanee, Union, Westbrook, Clareview, Palace Road, Amherst Island, Emerald, Bath, Farmer's Friend, Maple Ridge, Enterprise, Whitman Creek.

Ottawa Syndicate: W. W. Dool, Instructor.

Jockvale, Hawthorne, Russell Road, Eastman's Springs, Blue Bell, Edwards, Banner, North Osgoode, Metcalfe, Cold Springs, Gilt Edge, Vars, Morning Star, Sarsfield, Greenwood No. 1, Greenwood No. 2, Navan, McGregor No. 1, Hillside, Russell No. 14, Windsor Star, Blue Joint, Blackburn, Pendleton, Spring Brook.

Ottawa E. Syndicate: J. Villeneuve, Instructor.

Casselman, St. Adrien, Aurora, Fournier 89, St. Isidore, G. 557, T. P., Ritchance, Empire B., G. 124, W. S., Oxbow, T. D. 8, Q. M. G. 5, Russell No. 1, T. D. 9, Q. No. 1, A. No. 5, Nation River, C. Q. 1, C. Q. 2, Ettyville, A. 35, A. C. 4, Riceville, Bolt, Alfred.

Ottawa W. Syndicate: R. Elliott, Instructor.

Admaston, Bonnechere Valley, Carleton Model, Diamond, Dirleton, Everitt's No. 1, Equal Rights, Gold Medal, Glasgow, Grattan, Hazeldean, Independent, Kidd's No. 4, Madawaska, Maple Hill, Pine Grove, Pure Gold, Pine Grove McNab, River View, Stonebrook, Union Pride, Union Star, Victoria, Waba, Woodlawn.

Perth Syndicate: W. G. Gardner, Instructor.

Mississippi, D. & E., Tayside, Drummond Centre, S. & L., Fallbrook, Dalhousie Lake, Park Hill, Scotch Line, Harper's, Ferry Road, Fernleigh, Ardoch, Ferry Star, Tennyson, Bathurst Mutual, Moberly, Poland, Hopetown, Middleville, D. & L. Union, Clayton, Farmer's Own, Balderson, Lanark and Darling, Plevna.

Syndicate.	Instructor.	No. of factories.	Full day visits.	Call visits.	Patrons visited.	Meetings held.	Tests for adulteration.	No. watered.	No. deficient in butter fat.	Money from fines imposed.	No. factories paying by test.	No. fermentation tests.	Percentage good.	No. factories repaired.	No. new factories built.	Total expenditure in improvements and new factories.	No. makers who kept factories clean and tidy.
Alexandria	A. McDonald	24	93	52	24	3	3,244	2	18	$225	....	300	30	9	1	$2,900	15
Almonte	W. J. Ragsdale	25	125	75	253	2	3,088	9	8	40	....	713	20	25	....	4,000	7
Bancroft	Jas. Irwin	18	101	49	......	....	1,154	3	2	15	....	0	......	6	....	530	7
Belleville	H. Howie	27	127	63	49	7	4,455	3	4	......	....	118	......	17	6	16,700	25
Brockville E	A. H. Wilson	25	126	106	155	5	3,508	11	10	75	....	627	60	22	....	5,833	20
Brockville N	P. Nolan	33	120	117	22	....	2,976	1	3	......	1	191	55	14	2	5,000	25
Brockville W	S. S. Cheetham	30	126	117	139	4	2,452	5	15	100	4	630	30	19	4	9,120	15
Campbellford	R. F. Gray	28	125	105	15	1	3,185	1	4	......	....	617	60	13	....	2,000	20
Chesterville	L. A. Zufelt	24	111	100	34	1	2,267	1	1	45	3	171	65	8	1	1,500	10
Cornwall	J. Buro	23	128	64	9	2	4,341	10	60	20	4	174	......	25	....	2,760	16
Kemptville	D. M. Wilson	28	117	120	115	9	3,089	10	3	230	3	337	30	7	....	2,400	23
Kingston	Geo. Robinson	30	114	135	155	2	2,798	7	5	......	....	39	7	20	....	2,220	20
Lancaster	E. Wilkinson	22	106	94	40	1	3,768	3	30	105	8	251	50	15	1	2,930	10
Lindsay	D. J. Cameron	25	105	36	62	....	3,628	3	3	......	5	128	40	16	...	800	19
Madoc	A. Herity	29	140	149	235	10	4,852	3	4	50	....	175	40	15	....	3,150	24
Maxville	R. Rothwell	30	124	86	320	10	2,942	4	32	20	1	293	42	11	3	9,213	10
Morrisburg	C. W. Norval	29	140	93	238	2	3,045	6	6	90	2	870	75	6	1	3,000	10
Napanee	Geo. Bensley	28	132	62	144	....	120	12	1	160	....	485	70	11	2	3,750	20
Ottawa	W. W. Dool	25	104	129	30	1	1,712	5	1	50	3	81	69	7	4	7,000	23
Ottawa E.	J. Villeneuve	27	134	86	99	5	3,930	16	10	15	3	240	10	22	3	5,500	5
Ottawa W	R. Elliott	25	101	90	127	2	1,595	2	3	95	2	308	80	9	1	3,900	16
Perth	W. G. Gardner	26	104	78	83	....	2,220	......	7	......	....	207	18	15	....	6,220	21
Peterboro	R. W. Ward	26	120	148	294	3	1,078	4	2	......	10	147	55	26	2	7,342	24
Picton	H. Brintnell	23	123	68	218	5	182	24	4	85	....	300	10	5	2	6,300	18
Plantagenet	J. Charbonneau	26	112	97	81	2	2,823	18	11	105	....	264	22	2	1	1,000	6
Singleton	F. Singleton	22	108	121	138	6	2,700	2	7	85	....	344	71	19	....	1,530	14
Stirling	J. B. Lowery	28	125	114	239	3	5,364	4	5	......	....	343	10	26	....	3,000	24
Vankleek Hill	C. Ferguson	21	83	148	34	2	1,770	4	8	190	1	17	10	6	....	400	10
Totals		727	3,274	2,702	3,352	88	78,086	173	267	$1,800	50	8,370	1,019	396	34	$119,998	457

PETERBORO' SYNDICATE: R. W. Ward, Instructor.

Apsley, Centre Smith, Daisy D., Indian River, Keene, Killarney, Lakefield, Melrose Abbey, Maple Leaf, North Dummer, Norwood, Ormonde, Oak Leaf, Pine Grove, Peterboro', Shearer, Stony Lake, South Burleigh, Selwyn, Shamrock, Trewern, Villiers, Warminster, Warsaw, Westwood, Young's Point.

PICTON SYNDICATE: H. Brintnell, Instructor.

Allisonville, Ben Gill, Bethel, Black River, Bloomfield, Clover Dale, Cressy, Cherry Valley, Elmbrook, Elmwood, Glenview, Hyland, Mountain View, Massassaga, Northport, Point Traverse, Quinte, Royal Street, Union, Union Vale, Waupoos, Weller's Bay, Maple Leaf.

PLANTAGENET SYNDICATE: J. Charbonneau, Instructor.

G. 868, T. W. No. 1, Alfred Cheese Co., A. F. W., 918, Canada, C. T. No. 3, Chard, G. 145, Ottawa Valley No. 2, Stonebrook No. 1, Canada 225, X. C. No. 2, The Lake 875, Plantaganet, North Indian, 238, Canada No. 2, Ottawa Valley No. 1, Centre, Cob's Lake, C. No. 5, Green Bank, Stafford, J. Q. No. 2, Hammond.

SINGLETON SYNDICATE: F. Singleton, Instructor.

Lombardy, Brooke, Taybanks, Elmgrove, Westport, Ontario, Golden, Prospect, Stanleyville, Ardmore, Mapleton, Mountain View, Model, Bedford Mills, Osceola, Greenwood, Rankin, Micksburg, Cobden, Westmeath, Beachburg, Clear Springs.

STIRLING SYNDICATE: J. B. Lowery, Frankford.

Deloro, Rose, Stirling, Spring Hill, Cold Springs, Shamrock, Champion, Glen, Bell, North Star, Kingston, Maple Leaf, West Huntington, Daisy, Plum Grove, Hoard's, Acme, Enterprise, Springbrook, Cook's, Evergreen, Wooler, Harold, Marmora, Spry, Central, Monarch, Riverside.

VANKLEEK SYNDICATE: Claude Ferguson, Inspector.

Farmer's Fancy No. 1, Farmer's Fancy No. 2, Lochinvar, Glen Andrew, Maple Leaf No. 7, McAlpine's No. 2, McAlpine's No. 3, McAlpine's No. 4, McAlpine's No. 5, Spring Grove No. 1, Spring Grove No. 2, Spring Grove No. 3. Aberdeen, Stardale, Barb, Golden Hill, Spring Creek No. 1, C. P. R., Hawkesbury, Dalkeith, Maple Row, Maple Leaf 39, Victoria, McLeod No. 4.

As I have stated, the number of factories that received regular instruction during the past season was 797, and to these the instructors gave 3,274 full day visits, for the purpose of giving practical instructions in cheesemaking, and of inspecting the quality and condition of the milk arriving at the factories.

During the hot weather, when the milk is in its worst condition, the instructors had to keep a closer watch on the makers in their charge, and to do this, the factories had to be visited more frequently by what we term call visits. Of these a total of 2,702 were given. This number greatly exceeds the number of the previous year and partly explains the reason why the quality of the cheese was kept so uniform in the most trying time.

By visiting the factories at shorter intervals, and spending some time in the curing-room with the maker, the instructors are often able to be of much service in remedying defects in the cheese as if they had spent the whole day in the factory.

This is particularly true with makers who have a good knowledge of the principles of cheese-making, but who are liable to be confused owing to the varied conditions in which the milk is received.

And when I mention these conditions of the milk I regret to have to say that as a general thing there was not the expected improvement in the condition in which the milk arrived at the factories.

The nature of the season no doubt had its effects in influencing the quality of the milk, but back of it all there is the continued carelessness on the part of a certain percentage of the patrons. We have held a large number of meetings and discussed the care of milk, and a very great number of farms have been visited for the same purpose. So that I really believe that the number of patrons who now do not know how best to care for milk must be very small.

It is not because they do not know how, but because they do not furnish themselves with the appliances and utensils with which to work, and when the hot weather comes on they are practically at the mercy of the weather conditions.

It is true that a great many have made satisfactory improvements, but it is the one common story from nearly every section that a large share of the milk is over-ripe and of bad flavor, and from information received from our instructors I believe that more milk was rejected and returned home than has been in any previous season.

It may be that the makers are getting more particular, and are protecting themselves by being more careful in selecting the milk on the weigh stand, as in many instances it seems to be the only thing that will stimulate a careless patron to be more particular.

This year the farms of 3,352 patrons were visited by the instructors and 88 meetings were held, so that with all our efforts of education I cannot understand why so many fail to provide means of keeping their milk at a low temperature, when they must know what a loss they suffer when a can of milk is returned, especially when the market for cheese furnishes such satisfactory prices as have prevailed during the year just closed.

Nearly all the instructors report that a very large number of new milk cans have replaced the old rusted ones, and I doubt if there were ever so many new stands with facilities for cooling milk erected in one season; so that excepting for the neglect of a few patrons in each factory, everything points to an increase of interest and improvement by those who furnish the raw material.

A total number of 78,086 tests were made for adulteration of the milk; 13 of these samples contained added water and 267 were deficient in butter fat.

This is a slight increase over the number adulterated last year, and the sum of $1,800 was collected as fines from the offenders and paid into the factories of which they were patrons.

It is to be regretted that so many still persist in this work, and it seems that the only way of preventing it would be to pay for the milk according to quality.

Never in the history of my work as Chief Instructor have I been able to report such a great increase in the amount of money expended in repairing, rebuilding, and re-equipping the places of manufacture. A total number of 396 factories was repaired in some material way and 34 new buildings were erected. The estimated cost of these improvements amounts to a total expenditure of $119,998, and before the opening of another season this amount will be largely exceeded. At present the amount is over $19,000 more than was reported last year, and represents one of the most encouraging results of the work of instruction.

In connection with these results we have to give a great share of the credit to the aid we received from the work of the sanitary inspectors. The improvements are being continued throughout the winter, and the coming spring should see a very marked improvement in the conditions surrounding the manufacture. Never were the factories kept in such a clean sanitary condition, and we owe our greatest appreciation for what we have been able to accomplish to the new sanitary laws regarding the manufacture of cheese.

One of the greatest hindrances of the past in getting the manufacturers to improve their buildings and equipment has been the lack of protection they were afforded by their patrons in return for the money expended. The price of manufacturing has been too small in many cases, and a factory owner cannot afford to make extensive repairs. Then again, he can never tell when some of his patrons will leave him or some one else come in and start a factory at a close distance and perhaps render valueless the building and business upon which he has spent so much. If factory owners could be given some protection in this respect, I am sure it would not be very long until the great majority of our factories were in a creditable condition.

Perhaps the most important branch of our work, and the one upon which our success most depends, is the quality of the cheese resulting from the improvements made.

In this connection I am pleased to report that the quality has been of exceptionally high standard, and although the makers met with a good deal of difficulty in the hot weather I doubt very much if we ever had such a successful year.

There was a marked decrease in the number of reclaims, and the June, September, and October cheese exceeded all previous corresponding periods for fineness of quality.

There was a surprisingly small number of acidity cheese, and in this respect alone the improvement is very worthy of mention.

It is quite evident that the makers are adopting more uniform methods, for, where formerly the cheese from whole sections was inferior, there are now only a few in each district who have any serious trouble.

By the skilful use of such appliances as the acidimetre, and pure cultures, aided by the greater attention that is being given to the cooking of the curd, there is no reason why the defects in the manufacture should not be largely overcome. The finish and general appearance of the cheese, too, has been given more attention by the makers, but they have still much to do in this important part of their work.

In the early part of July the instructors were given their third visit to Montreal, where the common defects found in the cheese were pointed out to them by the expert merchants. A number of representatives from the different cheese boards were also present on this occasion. The information gained by these men was carried home to the makers and patrons, and I believe a great deal of good resulted from this practical and profitable demonstration.

This year, I cannot but repeat in an emphasized way what I said in my last report regarding the shipping of cheese from the factories in a green uncured state. Caused by the high prices, this practice has been more common than ever, and the effects are being shown now by the reports of short weights and injured quality coming from the old country merchants.

I am glad, however, to say that a great improvement is being made in the curing-rooms throughout the country, and I trust that next season the cheese may be kept in the factories until properly cured, and without being liable to injury from hot weather effects.

During the season I keenly felt the absence of the official referee in Montreal. I find it very necessary in my work to keep in close touch with the export end of the trade, and in former years I used to get a great deal of valuable information from the weekly reports I received from Mr. Woodard. From this information I was able to keep the instructors well posted, and to notify them without delay whenever the cheese from any of their factories were being faulted by the buyers. To get this information during the past season I had to visit Montreal more frequently myself, and as a result I was not able to personally visit so many of the factories. However, I was able to visit 386 of the syndicated factories, and some 20 that were not in any of the groups. When on these visits I invariably found the makers much improved in their personal appearance. They kept their factories cleaner, the surroundings more tidy, and they received the assistance and advice of the instructors in a friendly and appreciative manner. I was also present at thirty dairy meetings, and as a rule found a good attendance, and those who attended showed an increase of enthusiasm in the work.

My opinion is, however, that splendid results can be accomplished by providing competent speakers to attend the annual meetings of the factories, when practically every patron is then present.

The instructors as a rule are doing good work, and are well acquainted with the conditions in their respective districts, and I know of no one who should be better fitted to address these meetngs than the local instructor. A number of such meetings were attended last winter, and the results in these factories have been very noticeable in the way of an improved milk supply and in the general interest taken by the people. The instructor, too, becomes better acquainted with the patrons, and they appreciate his efforts more readily the following season as they then better understand the true object of his work. That the people are becoming anxious for speakers at these factory meetings is well shown by the large number of requests I have received from all parts of the country. I must say that I regret that I have not had the time to be able to comply with more of these requests, but we cannot do everything at once.

I believe we have just finished the most successful year in the history of the instruction work and in concluding my report on the same, I must say that I feel we have accomplished results that will have a very material and permanent effect.

I want to express my appreciation of the conduct and work of the instructors. I have found them at all times willing and anxious to carry out my wishes and they have put forth an honest effort to bring about improvement in their respective districts.

I also feel grateful for the kind assistance of the Montreal merchants, who were always willing to help me in any way, and for the privileges they allowed the visiting instructors and factorymen while examinng the cheese in their different warerooms.

Before closing, too, I would like to thank the directors and members of the Executive of the Association for the active part they have played in the work of the year, and to express the hope that the coming season will see an even more creditable ending than the one we have just closed.

Prof. **Dean**: What standard did your instructors have for fat?

A.—If the milk goes below 3 per cent. the instructor went to the farm and saw the milk, and got a sample. If the milk delivered at the factory was below the standard got on the farm it was deemed deficient in fat. We found cows this year giving milk as low as 2.6 per cent.

The CHAIRMAN: That is the best paper that we have ever had at this convention.

Prof. RUDDICK: I want to congratulate Mr. Publow on his most excellent report, and I would like to congratulate the Dairymen of Eastern Ontario on being able to command the services of a man who is able to present such a report. I give place to no one in my admiration of Mr. Publow's work. I know something of what it means to carry on the work he is doing, and have had some experience in that line. Mr. Publow and I started under the auspices of the Dairymen's Association during the same year, and I know that no man has worked harder than Mr. Publow, and it is wonderful to me that he has been able to preserve his youth. I think he must have some secret.

I believe the sanitary system of inspection is the proper system. I believe it would be a decided advantage, if, in addition to the organization so far as it goes, there was a little further organization, and our syndicate was organized with officers for the syndicate: a President, a Secretary, and a Board of Management. In that way you would get a large number of people directly interested in the work, and it would be probably easier to reach the factories by having someone in communication with these syndicates. I believe it would be an assistance to the instructors, and you would get a larger number of people more interested. I am drawing my conclusions from experience in the Province of Quebec where syndicates were organized a good man years before they were in Ontario. I did say that I thought it would be better to wait until you were able to start them in that way.

Mr. PUBLOW: We adopted that system this year, and we are trying in every county to have the people nominate a man to represent them.

Mr. RUDDICK: I am glad to hear that. Another matter Mr. Publow touched upon which I think is of importance is that of shipping green cheese. I was glad to hear Mr. Publow's reference to the official referee in Montreal. I should be very glad to co-operate in any way with Mr. Publow in his work, and if the official referee could be of such service as he points out I think it is a very strong argument in favor of the appointment of a referee. The position has not been refilled since Mr. Woodward resigned. I would be glad if this Convention would give an expression of the desirability of having a referee.

A MEMBER: In curing good cheese in cold storage, and at a low temperature, is it a bacterial or a chemical change that takes place?

Mr. RUDDICK: The temperature at which it is cured does not effect the matter in any way at all. It affects the rapidity of the change which takes place. The best authorities agree that there are two processes in the ripening or curing of cheese, one of which might be called a chemical process, and another process which may be called a bacterial one. One has to do with the chemical or digestive process, or with the change of the curd from that insoluble condition into a soluble one, nd the other process has to do with the development of the flavor. There is much to be learned yet of the changes which take place in a cheese during the ripening process, but briefly I think that covers the point.

A MEMBER: There is an article published in the *Canadian Dairyman* from the pen of Mr. Barr, in the issue of June 15th, which refers to the removal of curd from whey, regardless of the cooking. Going by the amount of acid that is provided, you are dipping curd at 18 by the acidimeter; would you recommend removing the whey at 17, regardless of all other conditions? I would like to have an explanation from you on that point.

Mr. Publow: Our experience is that when we handle curd in the vats I find that it is not best to remove in a soft condition. What Mr. Barr says might apply to the west, but in the east where we handle the curd on the pan we have obtained better results from keeping the curd until sufficiently formed. I recommend that you get your whey out of the curd as sweet as possible. It is not safe to remove a curd in a soft condition because it mats up very rapidly. You should endeavor to get the curd formed before the acid comes on, but if the curd is quite soft it is better to hold it there. It is not the whey around the curd that brings on the acidity. In handling this thick milk it is advisable to draw with as small an amount of acid as possible. To the makers who are using racks I would say to draw as sweet as you can. Curds coming off in a short condition must have less acid.

A Member: Do you think the cheese will be delivered to the consumer in a better condition than if you have the curd a little less cooked in the whey, and left with a little less acid than to cook them properly in the whey?

Mr. Publow: I recommend that you try and get the first working curd to work just the same out of the whey as normal working curd. You can do that by cutting fine, and getting the moisture out while it is in the whey, and cook higher—perhaps as high as 106 degrees—depending on the ripeness of the milk; and when you get it as firm as normal working curd, remove the whey and put it in two or three pails of cold water, if you have good water. That prevents the curd from matting, and you get the best results in that way. We have had the ripest milk this year that we got in six years. We have had milk in a worse condition, owing to the extremely unfavorable weather, and the cheese have shown less acid. The danger, perhaps, in drawing these curds off soft and sweet is that you get your cheese open; but I do not know that is such a serious difficulty. I think we have laid too much stress on closeness. While it is desirabl our cheese should be close, I would prefer to have them slightly open and with less acid. I think any person would rather have cheese with a few holes in it if they were smooth and nutty in flavor. I am glad to know that the merchants in Montreal are not laying so much stress on that. If the cheese are clean and nutty in flavor you do not hear much complaint.

Mr. Macpherson: A number of patrons show arele sness in the care of their milk, and I think that is the key to the whole situation. That being the fact, what method or what way should this Convention discuss the question of how to make these careless patrons take more care of the milk? I have been thinking that as the Government is offering prizes and medals and in many ways trying to improve many things, I should think there could be a prize given for the best product of milk, so as to encourage men to take better care of it. I think it would be a splendid thing to have these careless patrons, from year to year, offered a prize in order to make them more careful. I would suggest the syndicates to offer a prize to the patrons who delivered the best milk.

Mr. Putnam: I have been wondering how many makers make it a point to go to their patrons in a kindly way and give them instruction as to the best methods for the care of milk. It appears to me that if the maker was properly interested in his work he should go to the patrons and take them into his confidence, and give them all the assistance he could, and ask them for suggestions regarding his own work. Many of the cheese-makers are in it just for the present year, instead of thinking it as a business, they are going to spend their life work at.

Mr. Publow: I am pleased to say that the makers are putting forth greater effort along that line than ever before. It is difficult to get men who are capable of doing this work. It is surprising how many men lack the ability to do that kind of thing. I would strongly recommend the dairymen of this country to make the business of cheese-making more attractive to our bright, intelligent men. Boys cannot do it; it requires old heads as a rule to deal with older men. I know that we get the best milk where we have the brightest men on the whey stand; men who have the knowledge of how to handle people. I care not how skilled you are and how good your building is, if the raw material is wrong, your product will be defective. We are trying to set an example and get better milk in some sections. We have all the patrons coming to the factory, and the people are all seen by the instructor every morning at the stand because they are all there. Owing to the small prices that have been paid to makers, and a shortage of help, the managers of some factories have had no opportunity of getting out among the people. We should not depend on the Government to do everything. When you find the milk being delivered to the factory in an improper condition, call your people together and say "Gentlemen, this milk is not in condition, and I cannot give you good results."

A Member: Make it compulsory.

Mr. Publow: I went to a large factory, and the cheese were wrong. The maker was a good maker, but the patron's milk was in such a poor condition that I knew it was the cause. I said to him, "Why don't you send the milk home?" and he said, "Well, if I did he will go some place else. I wish you would call a meeting." I called a meeting for the next Wednesday night, and I had an instructor come there and take a sample, and I came that night and addressed the people. I do not think I ever saw milk in a worse condition, and I gave the people a fair talk with regard to the care of milk. After I got through I sat down, and the President of the factory got up and said, "That was a splendid address, but what business have you to come here and talk like that when our cheese are being selected on the board first call, and we get the very highest price." How do you think I felt? The fact of the case was the cheese had been cut in price the last three weeks, and president of the factory did not know it, and the patrons did not know it. The cheese-maker had made arrangements with the buyer that at any time his cheese were rejected to make out a check in full and he would pay the loss. Now, if the cheese-makers are going to do that kind of thing, how is your instructor going to help you? The people found out afterwards what was the matter, and now they have a different man to the one they had. I said to the President, "Is it possible that you did not know that your cheese had been rejected?" and he said, "No, the buyer was not honorable enough to come forward and tell them." That was one reason why that man lost his factory, and I hope he will never get a factory in this country, or in any other country again. A man that will do that sort of thing is not fit to run a factory. (Applause.)

DAIRY BACTERIOLOGY.

By W. T. Connell, M.D., Queen's University, Kingston.

The subject of dairy bacteriology while extensive and of much importance practically, yet offers but few topics capable of general treatment—such a treatment as must be given before an audience who are not interested in technical details, but who desire to have any new findings set before them in an assimilable form, or the old again presented in as new a dress as possible. As years pass it becomes to me a matter of increasing difficulty to so modify the old story as to make it appear new. Inded, to those on the platform it will be but an old story after all, but to my audience much may yet be new despite the attention which has been paid to the subject in the agricultural and dairy papers. I may state at first that I have little new to offer, as I was prevented undertaking any work by the burning of my laboratory early in summer, and it was only in October, after the regular college course had opened, that I was in a position to undertake any but the simplest work.

By way of introduction let me first point out that bacteria—or germs as many call them—are simply minute plants, so minute that powerful microscopes are required for the detection of the single plant. Bacteria are the smallest forms of plant life as yet made visible. Like other plants, they will grow rapidly when suitably nourished and kept at a favorable temperature. Indeed a bacterium may increase from a single plant to many million inside of twenty-four hours, when favorably situated in these regards. Thus rapidity of growth soon compensates for minuteness of size. Bacteria of different kinds are present almost everywhere, being found in air, dust, earth, and water; but very many of the kinds so found are of no importance whatever in so far as dairy work is concerned. The bacteria which are of importance in dairy work are those which, when they find their way into milk or its products, are capable of developing therein and producing some change in their constituents, setting up what we may term fermentative changes. Dust and water, and the like become dangerous to milk only when they contain such bacteria, nd they contain dangerous bacteria practically only when they come from dirty or foul sources, even though to ordinary observation they may appear to be free from such contamination. Manure and manurial dusts are always loaded with bacteria, capable of developing in and fermenting milk, and fermentations set up by entrance of bacteria from such sources are very common indeed.

As you all know, it is the rule for milk when kept to undergo some fermentative change, and the common change is souring and curdling and usually the higher the temperature (up to 100° F.) the more rapid the change effected. Examine now this souring fermentation, for it is of bacterial origin. We will note that the character of the souring often varies. Sometimes we have a clean sour with a pleasant aroma, no gas in the curd, and the whey which separates from curd is clear; again we find sourness with more or less gas in the curd, and the whey slightly turbid at times, even milky; and with this we may find various flavors varying from "not clean" to "rancid." Combinations of these are found; or one may succeed the other and be followed in turn by other changes such as discolorations breaking down of curd, etc., these being due to further action of bacteria, or to others which probably do not grow till after souring fermentation has ceased. I want, however, to call attention to the two main types of souring, for the bacteria which are active in this process are also active in like fermentative processes in butter and cheese making. We have outlined two main types which I may term the clean souring type, and the type which causes souring with more or less gas production. The most typical bacterium of first type is the bacterium known as the *Bacillus acidi lactici* (Esten) called by some *Streptococcus acidi lactici.* Of the second type we have two forms, the *Bacillus coli* and *Bacillus lactis aerogenes*, which in some respects are closely related. Combinations of the first with one or both of second type are quite common, and when so, if the *Bacillus acidi lactici* is present in any numbers, usually it exerts a marked influence in controlling flavor.

In the ripening of cream in butter making, the process is largely one of acid production, and the bacterium which is usually found is the lactic acid bacillus of first type which has also the features of developing a good flavor and aroma. It is not uncommon to find as many as 500,000,000 bacteria per 1 c.c. of cream when well (but not over) ripened, which is equal to about 30,000,000 per drop. If the acid production is by bacteria of the second class there will be considerable tendency to flavor defects, especially cowy flavors, and while in some cases these will not be noticeable at once, such butter has poorer keeping qualities and tends to become bad, even putrid at times. I have an opinion, which I have not been able to prove, that such butters are particularly prone to develop butyric acid, and thus become rancid.

In like manner in the manufacture of our Canadian cheese, one of the most important features is the development and control of the acidity. This acid production is most actively produced by the bacteria of the first type, and with it we have the development of proper flavor; while in baceria of the second type, though we may have acid production, it is variously accompanied by gas production even to extent of floating the curd, and also with more or less flavor defect. The reason for this I will endeavor to explain a little later.

The type of desirable fermentation, then, in both butter and cheesemaking, is that produced by bacteria of the species *Bacillus lactici acidi* (Esten). What are the sources of this bacterium? Usually it is quite abundant in and about dairies and factories which are reasonably clean. It is often present in the foremilk, and may be found in milk pails or cans not thoroughly scalded. Practically, under ordinary conditions, it is almost constantly present in milk, and as it is capable of thriving well in milk even as low as 65 F., its presence, unless the milk be heavily seeded with some other bacterium, is assured. Further, once this bacillus has started to develop well, usually it can control or check the development of other bacteria unless heavily seeded.

Lactic acid bacteria of this type are the basis of good starters, and it is cultures of these bacteria that are sold as "Startolene," "Lactic ferment," etc.

Now as to bacteria of the second type as represented by *Bacillus coli* and *Bacillus lactis aerogenes*, these bacteria are also very common about dairies and stables, and altogether too common about many of our factories. The *Bacillus lactis aerogenes* especially is like the lactic acid bacillus in that it finds in milk an excellent medium in which to rapidly develop, although ordinarily it does not quite equal *Bacillus acidi lactici* in this respect.

The *Bacillus coli and Bacillus lactis aerogenes* are almost constant inhabitants of the excrement of cattle, and of other animals and fowls.

Excrement itself, excrement laden dust, or excrement polluted water are the main sources of infection with these bacteria, and such infection is altogether too common. Of course infection may also come from improperly cleansed cans when these cans have contained previously infected milk, or carried back infected whey. It has been shown time after time that the ordinary cleaning which cans get at farms very rarely succeeds in making them bacteriologically clean.

Right here let me digress a moment to speak of the character of some of the cans which are still coming to our factories, rusty, full of seams, which it is almost impossible to cleanse, and in which one can see gross dirt, no microscope being required; even cans with rags stuck into holes are not yet altogether out of date. It is not possible with the methods now in use at the farms to so cleanse such cans as to free them from bacteria. Only steam or prolonged action of boiling water could sterilize these cans, and neither are readily adaptable at farms. It would pay every farmer to have properly constructed cans, first in milk saved, and second, in ease of cleaning such.

To go back to the acid forming gas bacilli again: These bacilli, in growing, ferment the milk sugar with production of lactic acid and other products, especially gases, but they also have some tendency to break up the casein leading to formation of ammonia and amines and like derivatives. If these latter products are formed, the acid fermentation is checked, and may be neutralized, and it is the further development of these derivatives which leads to many of the bad flavors. I am quite aware that in ordinary curing of cheese, products of the nature of ammonia and amines are normally formed as the result of the digestive action of the pepsin of the rennet; but I am here referring to the early development of these substances which indeed may occur in the vat. Nearly every cheesemaker will have had experience of cases where acidity has developed quite rapidly, usually with some gas, and then the acidity is checked, and it seems impossible to get more acid to develop. These are the class of cases where *Bacillus coli* or *Bacillus lactis aerogenes* are the common causes.

The more samples I examine of cheese that have some flavor defect, the more the role of these gas producing acid forming bacilli in the production of such defects is impressed upon me. Let me point out here a matter which we bacteriologists have to contend with. There are nearly 100 different varieties of bacteria already described by bacteriologists in the *Bacillus coli* and *Bacillus lactis aerogenes* families, and these varieties differing slightly among themselves it is which probably accounts for the variety of conditions induced. Further the action of these bacteria is much modified by the treatment during manufacture, the activity of the curing ferments, the temperature of curing, etc., so that the problem is an exceedingly complex one.

But it emphasizes one point and that is that the only desirable fermentation required in butter and cheese making is that induced by bacilli of type *B. acidi lactici*. Further, the undesirable types of acid fermentation can be kept out by care in milking and handling of milk, seeing that the causes of such bacterial fermentation come from excrement itself, excrement laden dust, excrement polluted water or from soiled utensils. The remedy is self-evident, viz., *cleanliness*. As an adjuvant, cooling of the milk ranks next. For bacteria need to have the temperature conditions favorable before they can develop. Cooling of milk checks this development, and milk in summer ought to be cooled as near 60° as possible and as early as possible.

During this past season I have had a fair number of farm well and factory waters sent me for analysis. I must again report that it has not been possible to rank more than 20 per cent. of these as being beyond suspicion. Five to 10 per cent. were doubtful while the balance, viz., over 70 per cent., were contaminated with bacteria classed as being of intestinal origin, some being grossly polluted. I must state, however, that samples are only sent me when suspicion falls on a water, and my experience so far goes to show that when doubt arises as to the purity of the water supply there is usually grave reason for it. Altogether too little care is taken at the average farm, and even at factories, to see to the purity of the water supply, yet pure water is essential to continued health of the individual, and a necessity of dairy work both at farm and factory. The dairyman is no worse, but rather better off in this respect than the general run of the population in our villages, towns, and even cities. Prof. Osler might well make light of our advances in sanitation, and point to the prevalence of typhoid fever, which is essentially a water-borne disease, in proof of his statements. I have not figures at hand, but I feel fairly safe in stating that there have been nearly as many cases of typhoid fever in the Province of Ontario this past year (1906), as in England and Wales, with a population nearly 20 times as great. As a people we are extremely careless in the disposal of our refuse and waste; it is allowed to pollute our sources of water supply, and we pay the price in a high case and death rate from enteric disorders, and the toll has been heavy in many of our towns, villages, and rural communities this past season. It is high time that the people of this Province looked more carefully after the purity of their water supply, not only in the interests of dairying, but in the interest of public health. Too much altogether is expected of the earth as a purifier of our water supplies. It is true that soil is an exceedingly efficient filtering medium, but too many farmers demand 24 hours work 365 days in the year in this respect, and it can hardly be supposed that even soil would stand this overly long.

I have again had brought to my attention by Mr. Publow, two instances of "rusty" discoloration of cheese, and in both instances I detected the same bacterium as was first demonstrated by me in 1896 from a factory in Leeds Co., and which I named *Bacillus Rudensis* (after Mr. Ruddick.) Both samples were secured by Mr. Publow from Montreal. With one he was not acquainted with the factory conditions; while the second occurred in a factory which was defective in structure and drainage to an extent sufficient to account for the origin of the defect, though the conditions were not so serious as these I described in connection with factory in which this condition was first worked out.

Mr. McCrady: I did not notice it myself, but a neighbor who was in cause any taste to the water?

Dr. Connell: Nothing in the pipes. There may be something in the water which would act upon the galvanized iron pipes, but there is nothing in the pipes themselves to produce any defect in the water.

Mr. McCrady: I did not notice it myself, but a neighbor who was in said the water had a peculiar taste, and he knew of another neighbor who had to discontinue the use of his well.

Mr. Ruddick: There is hardly a house in this city but is fitted with galvanized iron water pipes. When the pipes are new there is very often a peculiar taste. It comes from the lead that is used in making the joints.

A Member: What does Mr. Publow think with regard to a steel or iron whey tank?

Mr. Publow: I think they are the best kind, and I would strongly recommend any factory manager to put a steel one in. Prof. Dean has had experience with one in the Ontario Agricultural College, and we have had some put in, and in every case they have given satisfaction. There are many reasons why they should be put in. In the first place they never leak, and they are very easy to keep clean. They can be washed out and kept clean and dry. I would prefer a steel one to an iron one. You can get them from any boiler maker or manufacturer.

A Member: I would like to ask Mr. Publow if he would recommend the grading of cheese. I think the exporters should explain what their views are on that question?

Mr. Publow: They are pretty well graded as it is.

A Member: You say the patrons do not know the grades?

Mr. Publow: I believe there is nothing that would lead to improvement more rapidly than the grading of cheese and if cheese were bought entirely on their merits. (Applause.) Whether the trade in this country is in such a condition as to warrant it is another question. I think every merchant in Montreal is capable of judging his cheese. When I referred to the work of the official referee I was speaking from the standpoint of dairy education, and while I recognize the ability of Montreal merchants to judge cheese, yet, when I get reports from 15 or 20 men I cannot place the same confidence in them as I could from one man when I know his judgment. We have twenty-eight instructors trained to one standard. I have insisted upon our inspectors having a standard of perfection. We must have some ideal, and if there be any fault it is our object and duty to bring it before your notice. Very often cheese are defective but they pass Montreal; but we should make your cheese so that they cannot be faulted by any person, and I think the instructors should set their standard so high that, if the cheese come up to it, it will pass any person. We had fewer claims this year than before, but I do not want you to say that we did not have poor cheese. Many of the cheese passed the market because there was a good demand. Some of the buyers in Montreal are reporting that the cheese are defective, but they take them because the market is good.

A Member: I do not think we will ever be satisfied short of paying for cheese according to quality.

Mr. Publow: I think we had better work up to things. I think it is well that our own people should know the condition of affairs, and I am afraid, if you take stringent measures at the present time, you will wipe out a lot of our makers. We should work up to it, and we are doing it fairly fast. The tendency of the trade is to work along that line, and I think we will come to it.

A Member: What do you consider the weakest link in this whole system. It is quite evident there is a lot of cheese placed on the market that should not be, and I saw by the London papers that the wholesale merchants are advertising New Zealand cheese, where they have the grading system. They are advertising it as the finest in the world. I am inclined to doubt it. There is no doubt we have here in this country a naturally good climate in which to make cheese, and our people are as intelligent as any place else and there is nothing to hinder them from putting up as good a quality of cheese as any other country. I do not believe there is a man in this country knows his business better than Mr. Publow, and I would like to ask him what he thinks is the weakest link in the chain—whether it is shipping green cheese or a poor quality of raw material.

Mr. Derbyshire: You must not be led away with any idea that New Zealand or any other country in the world is doing anything in connection with the cheese business in comparison with what we are doing. How is it we can sell 85 per cent. of all the cheese that is sold on British market if we have not the stuff that will exactly suit the market. (Applause.)

Mr. Ruddick: I know something about the comparative quality of New Zealand and Canadian cheese, and I have no hesitation in saying that the Canadian cheese is very much better made cheese than New Zealand cheese. (Applause.) But I believe that the average quality of New Zealand cheese, as landed in Great Britain, is as good, if not better, than the average quality of the Canadian cheese. We sometimes forget that the cheese are only half made when they are taken out of the hoops, and that what follows always has a great deal more to do with the condition of the cheese than anything else. A great deal of our finest made cheese is utterly ruined because it is not properly handled after it is made. It is cured in the summer time at a temperature altogether too high for Canadian cheese, and which New Zealand has not got to contend with. That is the point. The average temperature in New Zealand will not go above 65 degrees; in extreme cases 70 degrees. The great bulk of their cheese is cured at a temperature of 60 to 65 degrees. They are talking of putting in cool curing-rooms. Some of them are doing so already, taking the plans I furnished. They have no hot weather in New Zealand, and there is no question of June or July cheese or September cheese; they are all New Zealand cheese, because the climate conditions are the same throughout the whole season. I believe New Zealand are giving nearly as good satisfaction on the London market as our own, although they are not so well made. New Zealand cheese does not compete with Canadian. They never did and never will, because they are made at the opposite period of the year.

Cheese coming from New Zealand are fresh made cheese, and they are not competing with ours. If fresh made New Zealand cheese were competing with fresh made Canadian cheese, there would be a very different story to tell. They have made rapid improvements under Canadian instructors. One of their instructors is a son of Mr. Singleton, and he has done great work out there. (Applause.)

The New Zealand cheese-makers do not understand the process of making cheese as our cheesemakers do. There are less than 100 cheese factories in New Zealand. New Zealand will show an increase of 50 per cent. over the previous year. That only means that the combined factories made cheese last year instead of butter. There has been very little increase in the number of factories in ten years.

Mr. Singleton: Mr. F. J. Evertts, of Brockville, stated on the board under the authority of the Commissioner of New Zealand, that the country had received two or three shillings per hundred more than the Canadian cheese had received, and we felt as though there was some person after us when that report came out from such an excellent authority as the Dairy Commissioner of New Zealand. Their position and condition is so much better than ours that they are bound to get ahead of us if we do not change our plan in some way. Their factories are larger. It would take a dozen factories in this country to make as much cheese as they make in one factory in New Zealand. That is one reason why they are getting ahead of us, and why every section of Canada that has a large factory is getting ahead of a section where smaller factories prevail.

Mr. **Wieland**: I think a point Mr. Singleton raised places the matter more on a commercial status than any other. Mr. Ruddick stated that New Zealand offered cheese at a certain time when it does not compete with Canada, and the reason they get a higher price is this, that they put their cheese on the market when cheese is very high. I think it is wrong to get it into your head that prices determine the quality of the cheese. You might sometimes get a low price for a very good article. I have bought end of July cheese in Montreal in 1893 or 1894 which was the finest quality of the year. I bought this cheese at nine cents, and they would knock the spots out of anything I am paying thirteen cents for this year.

Mr. **Singleton**: I am not saying it is true, but I am saying on the authority of Mr. M. K. Evertts, who quoted it on the Brockville Board, that their cheese was as good as ours, cheese for cheese.

The **Chairman**: They commence to sell their cheese when we are through making cheese. They make during the winter time, and if the price is high in the winter time, they benefit by it, and if the price is high in the summer time, we benefit by it.

A **Member**: I must thank these gentlemen for discussing this question. I saw that advertised in a London paper, and I am very well pleased with the explanation that has been made.

Mr. **Publow**: I think there are two or three links in the chain that want strengthening. Probably one of the first is undue competition or selfishness. The next two that most require to be made is the quality of the milk delivered at the factories. We want it delivered in a cooler condition, and then we want the curing rooms so constructed that cheese may be kept there for a long time at a uniformly low temperature. With these things corrected, we fear no nation in the world. We can make the finest cheese in the world.

MOISTURE IN CHEESE AND BUTTER.

By Prof. H. H. Dean, Ontario Agricultural College, Guelph.

The topic I have for this afternoon is more or less a technical one, and I hope I shall be able to make the points clear, so that you will understand what I have to say on that particular point.

The question of moisture is a very important one. Moisture is found in all dairy products. Milk itself contains over 87 per cent. of water; that is to say in 100 pounds of milk there is more than 87 pounds of water, yet some people think that it is not quite enough and put in a little more. Cheese consists of about one-third water, butter contains from 12 to 15 or 16 per cent., and in some cases more than that, of water. Moisture everywhere plays a very important part in all our dairy operations. I would like to make at the beginning this clear distinction between the water found in milk, water found in cheese, and water found in butter. A well known chemist said some years ago that there was no difference betwen water in milk, water in cheese, and water taken out of the well; but I hold there is a marked difference, and my conclusions in this respect are verified by the recent work you have probably seen by McKay, wherein he comes to the conclusion, after a great deal of experimenting, that there is a difference between the water found in milk, the water found in cheese and the water found in butter, or the water found in a well. Will you bear in mind that the water which we have in our cheese is the natural water of milk, and it differs from the water you have in butter, from the fact that the water in butter is taken out of the well, it is not the natural water of the milk. Therefore we may reasonably expect that cheese may carry more of this natural moisture than is to be found in butter. My personal opinion is that good butter should contain a small amount of moisture of water, but that cheese may reasonably contain a rather considerable amount of moisture. A fine quality of dairy products is of more importance than a large quantity. There is a tendency to sacrifice quality for the sake of quantity; that should never be done. I would like to make this point clear right at the beginning that anything we have to say on this question emphasizes the point of quality being more important than quantity.

Now there are various methods that have been adopted for determining the moisture in the various dairy products, and I shall deal first with some of these methods, and secondly with the practical results.

We have been following a plan recommended by chemists for determining the quantity of moisture in butter. We melt a sample, taking it first in a sample bottle like the one I have here. We take about three or four ounces of the butter and melt it. We take about six cubic centimeters. That is about one-third as much as you would take for the Babcock test. We put that into a dish which has been previously weighed. We then transfer it to an oven, such as I have illustrated on this chart, and we dry it for six hours, and then dry it again for one or two hours. Let me say a word about this oven. We simply tap an ordinary steam pipe in our buildings with a quarter inch pipe. There is a regulating valve which allows the steam to pass into the oven, so that the pressure never gets too high. We find it necessary to have something of that kind otherwise there would be danger of our oven being spoiled by people who come in to inspect the dairy, because nearly everybody wants to turn all the cranks and open all the valves that can be opened in the dairy. The steam enters the upper part of the oven, which is 6 by 8 inside, having a one inch space on both sides, top, bottom and the back, but no space in the front, the door shutting straight against the parts where the steam comes inside the oven; there are two racks with perforated holes, and these are movable. We have an outlet for the gas and condensed steam. This is also connected with a quarter inch pipe, and then we have a steam gauge showing the amount of pressure on the oven. The whole thing, outside of the safety valve, cost us $5. You may think that means too much work for the cheese-maker, but I hope to be able to show you before I get through that it is practicable, and that it is important to know the moisture of the curds which you are handling from day to day. We found that it was necessary in the first place to find out how much moisture there was in the average curds.

We have heard a great deal to the effect that we know all about cheese-making, but, if you will pardon me, I wish to say that I think we know very little about the principles of cheese-making. Is there a man in this meeting who can tell me how much moisture there is in curds when he dips them out of the vat into the curd sink, or if he simply handles them on the pan? Is there a man in this audience who can tell me how much water he has left in his curds? Is there a man in this audience who can tell, within one per cent., of the amount of moisture from day to day, or even within 5 per cent. of the moisture in these curds? I doubt very much if there is a man here who can do it. I have decided that matter with our own chese-maker, and I find it is practically impossible for him to leave the same amount of moisture in the curds on the same day, and they vary greatly from one day to another, and our cheese-maker has had ten years' experience. At least one-third of the cheese which you manufacture consists of moisture. It is necessary for the proper texture and for the proper fermentation of the cheese that you shall have the right degree of moisture. It is only reasonable that the cheese-maker shall know just how much moisture is being left in his curds from day to day.

The first thing we had to do was to find out how much moisture there is in a normal curd, and in the cheese after they have been made, and so far as I know that point has not been investigated at all.

Before I take up the results of our work, I want to say a word about a short method, because I can readily understand the cheese-maker would consider this too much trouble and expense. We have been working for two years on a method which I would commend to you, not because we consider it perfect, but because I consider it a step along the line on which I have been speaking—that is to get uniform moisture in the curds from day to day. Most of you have read about the method perfected by Professor Graham, of the Department of Agriculture in Washington. I have had correspondence with Mr. Graham and Mr. Webster, and they have promised to send us a set of apparatus for testing. Mr. Graham tells me the apparatus is not free except to the people of the United States, and any country outside of the United States that wishes to use this method must pay for it; but he offered to send the apparatus to us in order that we may test it to see whether there is anything in it or not. I would like to see a few cheese-makers try this plan which I shall outline to you. There ought to be some relation between the weight of a given volume of curd and the amount of moisture which it contains; that is the theory I started out with in the first place. Every advance which has been made in the dairy business in this country has been the result of a theory of some man. My theory was that a given volume of curd would contain a certain amount of moisture, and that as you reduced the moisture in the curd that the weight of the given volume of curd would get greater, but after I came to work my theory out I found the very opposite of that was true; that a given volume of curd, as we take the moisture out of it, grew lighter. That is one of the things that puzzled me for a long time. I thought it would grow heavier, but I found that it grew lighter, and I puzzled over that for a long time to know how that was, and I am not sure that I have it yet.

You will find all the details of our experiments in the annual report of the College. We found that 17.5 c.c. of curd, which has the same volume of acid you use in making the Babcock test, will weigh about one-tenth of a grain less for each six-tenths of the per cent. of moisture that is reduced in your curd. For every six-tenths of your moisture you stir out of your curd 17.5 c.c. of the curd is reduced one grain in weight. The theoretical explanation for this is that one-tenth is about six-tenths of one per cent. of 17.5. This is the mathematical relation which lies between one-tenth and 17.5. I have found as a result of practical tests covering over 100 tests, that is the relation which exists between the reduction of the moisture in the curd and its weight. Every time you stir the curd to reduce it six-tenths per cent. you reduce the weight of 17.5 by one-tenth of a gramme. Every time a given body of the curd is reduced one-tenth of a gram you have reduced the per cent. of moisture by six-tenths per cent.

I do not consider these figures perfect, but I give them to you in order that you may test the matter in your factories. There are plenty of men who cannot make a proper rennet test because they will not measure the rennet and the milk accurately. They will not note the temperature accurately, and the man who is not accurate in these points will make a failure with that test. I think the man who is accurate in his tests will get uniform moisture in his curd day after day.

Now, I will give you some practical results with reference to moisture in butter. We have not found that there is any definite relation between moisture and what is called over-run. May I say a word about what is meant by over-run. By over-run in butter making we mean the excess of butter over fat in the milk or cream. For instance, if you take in 100 pounds of fat and you make 116 ponds of butter, then your over-run is 16 per cent. A great many people think if they have 84 pounds of fat and make 100 pounds of butter, their over-run is 16 per cent. In that case the over-run is over 19 per cent. We have found there is no definite relation between moisture in the butter and the over-run. We found, following exactly the same method, on May 7th and 8th, an over-run of 16.27 per cent. and 17.8 per cent—a difference of nearly 2 per cent., following exactly the same plan. On May 12th the over-run was 21.7; on May 15th, 18.7; on May 17th, 20.9; on April 24th, 16.5; on May 25th, 19.1; and on May 1st, 21.5. We found that wherever we adopted the plan of increasing the over-run or to make more buter out of a given amount of fat, we did it at the expense of quality. I think I am safe in saying that a good many of our butter-makers in Western Ontario this year sacrificed the quality of their butter in their great desire to get a large over-run. In cheese-making the curd should contain from 47 to 48 per cent. of moisture, and then the cheese would contain about 35 per cent. of moisture when they were green. We found the curds having from 50 to 52 per cent. of moisture, so that the yield was increased a half pound to one pound per thousand pounds of milk, while in the majority of cases the cheese were not quite so good. In one case where we had cheese scored by Mr. Barr and Mr. Waddell, they scored cheese normal in moisture at only 92 while cheese containing over 50 per cent. of moisture when the curds were dipped were scored 94.5. We sent these same cheese to Montreal, and had them scored by Hodson Brothers, (and I desire to say that we are very much indebted to this firm for their great kindness during the past year), and they scored them at about the same.

It may be possible for the cheese-maker to increase the amount of moisture in his curd at dipping time and increase the amount of moisture in the cheese, and at the same time make a finer quality of cheese; but I would not like to have you run away with the idea that you should advocate loading up your cheese with moisture. This is a very important question, and one or two season's experiments will not settle the question. I believe there is a tendency in the trade at the present time to pay a higher price for goods with a meaty texture. In talking with a cheese buyer in the old country in 1905 there was this uniform expression that they did not want a bony cheese or a hard cheese. I think we have been making a mistake in this country in getting our cheese too hard and dry, and the cause of that was that we did not leave enough moisture in the curds.

Now, I advise you to go slowly. Do not say Prof. Dean advised you to load up the cheese with moisture; because you will find when you have more moisture in your curd the acid develops faster, and you have to be a better cheese-maker to handle such curds; but I do think that with a skilful cheese-maker, and one who understands his business, it is better to leave from 50 to 52 per cent. of moisture in the curd at the time of dipping, and at the same time make a cheese that will suit the markets a great deal better than a dry bony cheese. Hodson Brothers scored this cheese at 99 points, and the cheese that was made with the normal amount of moisture of 47 to 48 per cent. they scored 97. They took 2 off for texture and 1 off color.

I would like you to think over these things carefully, as they are points of great value to you as practical cheese-makers. I feel strongly that we are working along definite lines, and it is a pleasure to find that a few of the things we have advocated in years past, and which have been ridiculed, are now being advised by these same men. While the practical men will be inclined to make fun of the theories of the scientific men, if you will look back over the history of dairying in this country and the United States, you will find that a great advancement of dairying has been first outlined by the scientific men. Dr. Connell does not pose as a practical man, still I do not suppose there is a man who has done more for the practical cheese-maker in this country than has Dr. Connell. President Creelman brought before you forcibly last night that every man needs to be an experimenter to a certain extent. It will probably cost a little money, but it will well repay you, and I want to ask for your co-operation during this coming year. I do not think we have enough co-operation in connection with our dairy work. There is too much petty jealousy; too much rivalry in it all—the feeling that some man has got stuck on himself. This country is too big for this petty jealousy, and we ought as far as possible to co-operate in work of this kind. I would like to know of half a dozen bright fellows who would undertake a few simple experiments along the line I have been speaking of. (Applause.)

Mr. DARGAVEL: This is cheese-makers' day, and this session is for cheese-makers, and I am sure that after the address we have heard from Prof. Dean, who is so well qualified to give it, that there are many points on which you would like further information.

Mr. MACPHERSON: What is the best method of determining the amount of moisture at a given period of acid development?

Prof. DEAN: We have been making some very careful experiments on the question of the relation of moisture to acid, but at the present time I am not prepared to offer an opinion. I must ask you to allow us to work two or three years longer. The only practical method I know of at the present time is to weigh out a given body of curd in a dish, and put it into some drying oven for six hours, which will take you probably ten minutes to weigh, and then duplicate the sample.

Q.—What is your opinion of using less salt?

A.—We have tried that plan, and I am not prepared at the present time to give an opinion in reference to that. Salt expels moisture, and if you have less salt there is not so much moisture expelled from your curd. It is possible that some of our cheese-makers have been using too much salt. I think from a pound and a half to two and a half pounds for 100 pounds of curd is all that should be used. I think one of the causes of these hard, dry cheeses is the use of too much moisture.

Q.—In reference to the amount of moisture left in the cheese, what difference would it make in ordinary condition of curing cheese and cool curing?

A.—From the work we have done I would advise curing cheese at the lowest possible temperature. You will not get satisfactory results by lifting this curd with an excessive amount of moisture and cooling them at a high temperature. Dr. Connell will tell you that the organism which produces bad flavor will develop and the extra amount of moisture is favorable conditions for their development; and if you are going to leave in more moisture you should cure your cheese at as low temperature as possible.

Q.—Have you any experience of paraffining cheese?

A.—Yes, but this is a question I prefer not to deal with, as Mr. Ruddick has had more experience in paraffining cheese. It certainly keeps the moisture in the cheese.

Q.—Do you put the cheese in the cool curing room right from the hoops?

A.—We find the best results are got by taking the cheese out of the hoops and putting them, as soon as possible, into a temperature of 40 degrees, although we have found very little difference between putting them in at the end of the week as compared with putting them in directly from the hoops. We have been told by many men that in the fall of the year if you put the cheese out of the hoops into a low temperature your cheese will be spoiled. Now, in September we made three cheese out of ordinary milk. One of these was put into an ordinary curing room at a temperature of about 60 degrees, the other into a temperature of 40 degrees, directly from the hoops, and the third was put into an ordinary room at 60 degrees for a week, and then moved to a temperature of 40 degrees, and left there for six or seven weeks. These cheese were scored by Mr. Barr and Mr. Waddell, and they were then shipped to Montreal and scored by Hodson Bros.; all of these people scored the cheese put directly from the hoops into the cooling room 3 points higher. The sooner the cheese gets into a temperature where the conditions are unfavorable for the development of bad flavors the better will be the quality of the cheese. With perfect milk it is all right to use a high temperature, but perfect milk is seldom got in our cheese factories.

Q.—Would it be safe to increase the moisture in the cheese with the average milk we get from the factories?

A.—I am not advising any cheese-maker to radically change his methods. It would be better to make a few experiments, and see if it is possible to improve the texture of the cheese. That is where I think the improvement will come—in the texture. I think there will be a tendency to develop bad flavors if you ripen these cheese at a high temperature.

Q.—Cheese cure more rapidly at a high temperature?

A.—Yes. I think there is a misconception with reference to the question of temperature in the ripening of cheese. We have found by chemical tests that the rate of ripening after an initial period of four or six weeks proceeds at about the same rate at 40 degrees as it does at from 60 to 70 degrees. For the initial period of from four to six weeks there is a difference, but after that the rate of ripening proceeds at about the same rate.

Mr. Macpherson: Those kept at lower temperature will not evaporate as much moisture as those kept at a high temperature, and the amount of moisture will determine the condition of the cheese at a later period.

A.—The difference is only 3 or 4 per cent. If there is sufficient moisture for these ferments to work I do not think there would be so much difference, for the cheese evaporates so much moisture that there is not sufficient for the ferments to work; it would make some difference.

Dr. Connell: There is no question at all that if there is sufficient moisture at a high temperature there is a slight difference in the rapidity of the ripening, not more than 3 or 4 per cent. At the lower temperature the more moisture is retained will not hasten the ripening process. They may start off with the same amount of moisture in it, and at the end of four or five weeks there will be more shrinkage in that kept at the higher temperature. It is not the evaporation of the moisture that makes the curing faster.

A Member: In my section they are getting quite up-to-date in the cheese business. Three years ago we built a large cement factory, with solid cement walls, and we found our cement curing room was not sufficient to carry out our design, and last year we adopted the Government method of lining our curing-room on the inside with three thicknesses of lumber and three thicknesses of damp-proof paper and filling up the six-inch space with shavings. We thought that would be sufficient for an ordinary cool-curing room, but we found that our cheese moulded considerably, and this fall I got the curing-room down to about 45 degrees—I do not think it went over 48 degrees after the first of September—and I made a much better cheese. I have had the closest and best texture and finest flavored cheese I ever turned out. I made 80 cheese for my patrons and they took them all. I think if we make suitable cheese that the people of this country will eat just as much as they do in the old land. I advised my people to put in an ice chamber, and they did so. I offered my people that I would guarantee if they would put in an ice chamber, and if they would give me the difference there would be in the shrinkage I would pay for the ice chamber and furnish everything complete. I guess they thought there was something in it, and they decided they would do it themselves. I do not think there is an owner that will ever be a cent poorer for introducing that kind of thing in his factory. (Applause.)

Q.—Can you tell us something about the steel whey tank?

Prof. Dean: We have had about ten years' experience with the steel whey tank. I went to Goldie & McCullough, of Galt, and ordered them to cut a boiler in two, and we have used it for ten years, and I do not think there is any form of whey tank that is equal to the steel boiler. It must be eight years ago that I recommended that and some of you fellows laughed at me.

Q.—How often do you clean it?

A.—Our patrons do not take the whey back. We sell it to the farmers, and therefore we do not have to give that special attention that we would have to if the patrons were taking it away.

Q.—Have you had any experience with whey tanks made of steel that you have to put in the ground?

A.—I would never put a whey tank in the ground.

Q.—In some cases we have to, our factories are not built high enough.

A.—You could use an injector. We run it out of vats into a small tank, and then have steam pipe connection and take the injector to raise it right up into the vat.

Mr. Eager: What is the cost of that steel tank?

Professor Dean: Ours is only a small one. It cost us $40. It is 4 feet in diameter and 6 feet high.

A Member: I asked a firm the other day for the price of a tank that would hold 1,500 gallons and they quoted that sized tank at $110 f.o.b. Belleville. It was a quarter inch steel plate.

A Member: I do not think you can get an injector large enough to take the whey from three or four vats into a small vat?

A.—Why not have two injectors?

A Member: I do not think any two injectors could do it.

Prof. Dean: Get three, then. You can put an ordinary injector in your coat pocket, and if the injector is not satisfactory you can get a pump. We lift all our skim milk with a pump. It has capacity of 8,000 or 10,000 pounds per hour.

A Member: We have in our own factory tanks in the ground and an elevated tank, and we have built over that tank a square building with a roof, and we have an injector that runs away from the lower tank to the upper tank, and that gives us the best satisfaction. You will not find any stink in our factory, and we take in 20,000 pounds of milk in the morning.

PROF. DEAN: How do you clean this tank that is in the ground?

A.—We pay our men to do it; the tank is scoured twice a week. We make it a point to have it done.

Q.—How do you get the stuff out?

A.—We lift it out with the injector, and then we scour our tank and clean it.

Q.—What would you think of having a cement tank in the ground?

PROF. DEAN: The objection to the cement is that the acid eats the cement and you soon have a tank that is very difficult to clean. If you can keep you tank that is under the ground clean, it will be all right; but my experience is that where they have tanks under the ground they are abominable things.

Q.—Do you think you can save the whey in a tank?

A.—It should not be saved.

A MEMBER: We have a whey tank built of cement, ten by twelve feet and five feet deep. It was not built right in the first place, and we are troubled a great deal with a bad smell. But last year I undertook to show them how it should be built, and I had the bottom of it made so that it had 12 inches of a slant in all directions towards one corner, and in that corner I had a basin built that would hold 6 quarts, and I had an injector run from the boiler to that so that I could pump that vat out so that there would not be more than 6 quarts of whey left in it, and as soon as the whey is out I force pump the water right into the tank. The sanitary inspector was there this fall from Toronto, and he said it was the best constructed whey tank he had seen this side of Toronto. You would not think there had been any whey in it an hour after the whey had been taken out. The cement work in it is as perfect as it was last spring. That is my experience with an underground whey tank.

SHIPPING GREEN CHEESE.

BY J. A. RUDDICK, DAIRY COMMISSIONER FOR THE DOMINION, OTTAWA.

I would like to say one or two words in connection with the discussion, especially on that part of it which had a bearing on the cool-curing of cheese. I think you all know that we have had some experience along that line during the last five years. I made some rough calculations while the discussion was going on, and I found we have handled 15,000 lots of cheese in the cool-curing rooms, all more or less different because they were made in different factories and on diffeernt dates.

Regarding the question of moisture in these cheese, I want to say that the only advice we have had to give the factories in connection with that was to leave less moisture in the cheese. We had more difficulty with too much moisture than anything else. We had to refuse some cheese because they contained too much moisture. Cheese that were made to withstand high temperatures retained so much more moisture that it made a very material difference. I found that a large number of cheese, as we receive them from the factories, contained sufficient moisture, and some of them contained too much; and I have noticed that where they contained too much moisture there was a danger of the ends becoming soft and some lots did go that way.

PROF. DEAN: Did you actually determine the moisture in these cheese?

Mr. **Ruddick**: No.

Prof. **Dean**: Be careful; that is all.

Mr. **Ruddick**: I am speaking of the experience we had during these four years, and that was the only difficulty we did have, that some of the factories left too much moisture in the cheese. It is important that the cheese should be put in at a low temperature as soon as possible, but if you do that and take the cheese directly from the hoop, and put them into the cool-curing room, where there is a high relative humidity, you will have more or less trouble with mould on the cheese, and sometimes there is a tendency to develop soft rinds. We have found it was a decided advantage to have cheese dry on the surface. I think it will be advisable to have sufficient shelf room to carry one day's cheese at ordinary temperature where the air will be much dryer and then put them in the curing-room the next day. During the last three years we have had the cheese delivered to the curing-room the day after they were taken out of the hoop, but I would not leave them longer than that.

I have been investigating a little as to the development of our exporting of cheese, and I have learnt that the first lot of Canadian cheese was shipped to Great Britain in 1866. Therefore we have been forty-one years developing this export business. The first lot were shipped from Canada by the firm of Brown & Gillespie of the city of Hamilton, Ontario, and it was from that small beginning that our cheese trade has developed. For the first few years, till our cheese trade had become established, the merchants in Great Britain sent over to this country their agents, and other firms in Canada took up the business. For many years the cheese buyers travelled around the country and bought the cheese, and those were pleasant days for the cheese buyers because, if there was a sudden rise in the market they were able to get around and buy a lot of cheese before the cheese-maker knew of the increased price.

After that we had the development of the cheese boards, and I believe they have done a great deal for the cheese industry in Canada. Within the last ten years the business of buying cheese seems to have changed; the initiative has been taken by the merchants in Montreal, and Montreal is becoming the central cheese market of the world. There is more cheese handled in Montreal than in any other single locality in the world. All our cheese going over to the Old Country is distributed at various points over there. The merchant in Montreal has been in the habit of buying cheese in this country, and then offering it over the cable to customers on the other side; but it looks as though the latest phase of this exporting question means more or less confidential relations between the firms on this side and the other.

It was stated here this morning that it would be a great advantage to the cheese industry if cheese were sold and bought directly on their merits. That is a self-evident fact. We can easily recognize how that would be, but to bring that about is not quite so easy. It is easier to discuss these things than to put them into effect. The statement is made that the cheese is all bought at the same price, but while cheese are nominally sold for the same price on certain boards, they are not all paid for at the same price; there is a very great difference. I know some factories that regularly get a quarter of a cent above the highest market price in the locality. It is not very generally known, but that is so. I believe there are certain factories, I could name one or two, the produce of which sold for one cent a pound in the Old Country above the average price of Canadian cheese, simply because these factories, after three years of careful, persistent work, established a reputation which enables them to get this higher price. The reputation for making a good cheese is not won in a single season. The fact that you made good cheese this year and indifferent cheese next year will not give you a reputation. It takes years of constant, uniformly good work in order to acquire a reputation that is of any value. Therefore, I say that there is a very great difference in the cheese which is brought from the various factories over their cheese when the whole transaction is finally closed. It was suggested that official grading as they have it in New Zealand would overcome that difficulty. The matter of grading would not have anything to do with it. The system of grading as followed in New Zealand is a question affecting the management of large factories. They have a regular board meeting, and everything of that kind is brought to the attention of the management at once. If there is any trouble with the quality of the cheese or butter, the management know all about it. You heard Mr. Publow explain how certain factories were being cut in the quality of the cheese and the president and others knew nothing about it.

What I intended to speak of particularly was to refer to this question of shipping green cheese. During the last two or three years we have made a very marked advance in the estimation of the cheese consuming public in Great Britain, and there has been heard nothing but praise for the condition of Canadian cheese as landed on the British market, but I wish to assure you at the present time we are threatening this reputation of ours very seriously indeed by shipping green cheese. (Applause.)

I will read one or two of a large number of letters which I have received from leading importers on the other side. Messrs. George Wall & Co., one of the big companies of Great Britain at the present time, say:—

LIVERPOOL, Dec. 12, 1906.

MR. J. A. RUDDICK, Ottawa, Canada:

DEAR SIR,—We have for some time intended writing you on the quality of this season's make of Canadian cheese. Of course we know that your chief interest and ambition are centered in the progress and good name of Canadian dairy produce, and we consequently feel sure that you will receive any remarks we may make in the right light. We simply make them in the best interests of the trade, and not from any personal motives or from any wish to complain.

As a matter of fact. we think there are few who have so admired and complimented in the past years the progress of Canadian dairy industry, and we have often held up the uniformity of the good quality of Canadian cheese as an example of perfect system and organization. Unfortunately, we have this season had many more complaints than usual, and we think you will consider it in the true interests of the Canadian cheese trade that we draw your attention to this. In our opinion the cause of all the trouble this season is the fact that many of the dairymen have allowed their cheese to leave the factory too green. They may of course think that it is policy to avail themselves of excited markets and good offers, but in our opinion, by doing so they are killing the goose which lays the golden egg.

If all the factories were to make an agreement that no cheese should be sent out before they were a certain age, this would be greatly to the benefit of the interests of the future reputation of Canadian cheese, and it certainly would not prevent buyers when they got excited from making high offers, nor would it prevent the factorymen from accepting such. In delivering cheese too green, the factorymen simply do it to oblige the dealers, and get no thanks for it. They would receive the same price if they simply stated that the cheese could not be shipped according to the rules of the trade until they were so many days older, but instead of doing this we feel confident that this year they must have allowed the cheese to leave the factory in many cases almost as soon as they were made, and as stated above, this has simply obliged the dealer, and done harm in reputation to the maker and the reputation of Canadian cheese generally on this side. Further than this, it has meant what has seldom happened before, namely, that there have been serious losses in weight on many of the shipments arriving. This should not have been the case, and must act in the long run very detrimentally to the Canadian cheese trade.

You know of course that we are largely interested as distributors of Canadian cheese, and on this account we have taken the liberty to make the above remarks to you.

We hope that they will be of some interest to you and that they will perhaps be the means of stopping a practice, which, if continued, will steadily lose all the good name which you and others before you have had so much anxiety and trouble in creating.

Trusting that you are well, and with kindest regards,

Yours faithfully,

George Wall.

London, 14th December, 1906.

J. A. Ruddick, Esq., Department of Agriculture, Ottawa, Canada:

Dear Sir,—When you were over in England you asked us to give you any details in connection with the business of the cheese trade which might be of interest to those immediately connected with the industry.

We have noticed very particularly that cheese have been drawn from the factories very young, and this has produced an insipid flavor. We cannot say that it is what is understood as strong flavor; in fact, it is difficult to define, but it is certainly not conducive to consumption. Of course, we have not the actual experience of putting them on the counter, but it is sufficient for us to know that buyers are dissatisfied, and consequently take a great amount of trouble in selecting something which will have a "cheesy" flavor. It is impossible to explain in a letter what we mean by insipid, but probably your own experience of cheese drawn too soon for use will agree with ours. And there is another side to the question. The shrinkage in weight is large, and enhances the cost of the goods before they are sold here. We can turn to weights of cheese fresh landed where the loss is as much as 7 lbs. on 5 boxes. Now, seeing that the cheese weigh on an average ¾ cwt., this loss means just 1/ per cwt. We have none of these troubles to put up with from New Zealand, because they make us a shrinkage allowance of 2½ to 3 per cent. It is no use of our preaching to operators on your side, who are very often gamblers. What we want you to do is to use all possible influence with the factorymen to withhold selling any cheese that have not been made ten days, as we on this side get fearfully punished when handling such young cheese.

Regarding shipping, we have very little fault to find, as the steamship comapnies have made every effort to fall into line, and adopt suggestions thrown out by importers, and as a consequence, we have a better state of things existing now than has ever been known previously.

Yours truly,

Rowson, Hodgson & Co., Ltd.,
Arthur J. Rowson, Director.

The merchants in the Old Country place just as much stress on things like that as he does on a matter of quality. They seem to make a great deal more of fuss over a matter of a loss in weight than they do over a difficulty in quality. They do not like to be imposed upon, and they, therefore, trade with the goods from those countries where they have the least difficulty to contend with. I know it was a practice, when I was in New Zealand, that in weighing cheese they made an allowance of 3 per cent., because they recognized that these cheese were a long time before they reached the other side, and it did not make very much difference because the bulk of the cheese was then sent on consignment. We have also letters from Hodson Bros., Liverpool; Lovell & Christmas, Ltd., (Incorporated with Geo. Wall & Co.) Liverpool; Rowson, Hodgson & Co., Ltd., London; Hodgson Bros., Liverpool; Carrothers & Co., Liverpool; Eben Thomas & Co., Liverpool; Matthew Hudson & Sons, Manchester; W. A. McKnight, Liverpool; George Fletcher, Liverpool; The Colonial Produce Co., Bristol; Pullin, Thomas & Slade, Bristol; Spear Brothers & Clark, Ltd., Bristol; Willer & Riley, Ltd., Manchester; Jas. Smylie & Sons, Manchester; George Little, Limited, Manchester; Wall & Co., Ltd., Manchester; Pearson & Rutter, Ltd. All of these firms deal largely in Canadian cheese, and they point out that it is a very serious menace to the Canadian cheese trade. I do not know that any more serious menace has occurred to our cheese for many years. It seems too bad that when we have succeeded in reaching a high standard on the market with our cheese that we should have this difficulty to contend with. Let us see who is to blame for this sort of thing. I know and feel that customers on this side are to blame somewhat for offering to buy such cheese, but I think the responsibility exists more laregly with those who have them to sell. It does not make much difference to these gentlemen whether the reputation of the Canadian cheese trade is injured or not. It would not make any difference to them if the whole business went to smash because they would go into something else, and probably make more money than they do to-day; but it is your own business, and if you do not protect it you need not look to Montreal merchants to protect it. The factory men who have control of these cheese should refuse to sell them until they are in proper condition and until they reach the highest value, because green cheese has no real value. If you will not protect yourselves you need not expect outsiders or men who are interested in another phase of the question to do it for you. It does seem to me to be a very unwise policy to sell cheese when they are only half made. A cheese that comes out of the hoop and only two or three days old is not a cheese; you cannot tell anything about the quality that it may have later on. It may develop objectionable flavors, which may lessen its value very considerably. I know that Mr. Publow has expressed himself on that point to me. He has gone into the factories and found no cheese on the shelves, and I say that this custom of selling the cheese too green is a very foolish and unwise policy, and it is a great handicap to the cheese makers. You may say it is an advantage to the cheese-maker to get the cheese out of the factory and save the risk of having them go wrong. But do not make any mistake, if these cheese go wrong in the hands of those who have bought them, on the assumption that they are right, it will come back, in the end, to the man who produces the cheese, and it will go right back to the man who produces the milk; and I would like to have that idea of responsibility until the cheese are consumed fixed more firmly in the mind of the farmer. It does not rest altogether on the management of the factory. It rests very often with the men who produced the milk, and if you continue doing this sort of thing the price of cheese will be that much less. Do not make any mistake about it. There is a narrow margin in handling cheese, and if any losses occur later on it will come back on the man who produces the milk.

Another reason is that the cheese-maker is not able to follow his work and determine whether he is making his cheese right or not. No cheese-maker can tell very much about the cheese when only two or three days old. Every progressive cheese-maker should watch the character of the cheese he is making, and if he finds they require more moisture he gives it to them. But when the cheese are sold in the green state he is not in a position to do that. The cheese-maker naturally likes to get rid of the cheese because he thinks in hot weather they are liable to go off flavor if kept in the curing room. The remedy for that is simply to provide a proper temperature in the curing-room. If you have a proper temperature in the curing-room there is no urgency for getting these off your hands.

I have spoken so often to this convention on the subject of cool curing of cheese that I find it somewhat difficult to say anything new on that subject. Our experience during the past year confirms our results of previous years, and I want to draw your attention to one particular phase of this question which I think is worth noting. Last summer I had about a hundred small cheese made weighing ten to fourteen pounds. They were just ordinary cheese, no special selection, just common first grade cheese. They were placed in the curing-rooms, some at Woodstock and some at Brockville. They were left there all summer at a temperature of 58 to 60 degrees. There are two of them on the platform at the present time and we will have them cut up. I do not know what temperature they have been kept at during the last few weeks, but up to the end of the cheese season they were in the curing-room at a temperature of 60 degrees. They were paraffined ten days after being made. These cheese have been sold to various parties who like a nice piece of cheese, and I have heard so much satisfaction expressed over the quality of the cheese; they have developed that nice cheesy flavor, which is so much in demand. And that brings me to say a word or two on this question of curing at extremely low temperatures. I am quite prepared to admit that if you will select a large number of cheese and place some of them at a temperature of 40 degrees, some 60 degrees and others at ordinary temperature, some of these cheese will turn out better flavor or cleaner in flavor than some of the cheese cured at 40 degrees. But what I want to impress on the mind of the cheese-maker is that we often call good flavored cheese anything that has not a bad flavor. Such a flavor may be insipid, having no particular quality. Absence of bad flavor is not high water mark in cheese, and I am afraid we do not develop that high cheese flavor at extremely low temperatures. I believe we get near the standard when we cure the cheese at about 60 degrees. The cheese made in the old country sell for a cent and a cent and a half above the average price of the Canadian cheese. They are kept in the curing-room for three or four months. When I was in Scotland in August, 1905, I saw cheese made in April, May, and June on the shelves in the factories kept at a temperature of about 60 to 65 degrees. They have better milk than we have to deal with. There is an absence of bad flavor, and they have a real cheesy flavor. That is what I find in these particular cheese that have been cured at 60 degrees and held at that temperature four or five months. I am afraid we have been losing sight of the importance of this cheesy flavor which is necessary if you want to demand the highest price. When a green cheese is offered to a customer in the old country they say it is not bad cheese, but they do not want it. They do not make any allowance for its being green. They want cheese more or less developing that cheesy flavor. If we ship our cheese out from the factories, put them into the refrigerator cars, carry them to Montreal, and put them in cold storage on the ships, and have them held on the other side in cold storage, we will have that objection made that they are insipid, they are not cheese at all; they will not recognize them as cheese. I think it is too bad after we have attained the standard that we have that anything of this kind should come up, and I want to leave that point with you. It is a matter which every man who produces milk should take into account and should consider fully, just as much as those who are in charge of factories. I would like Mr. Publow to take charge of these cheese and have his instructors examine them closely, and let me know what they think of them. (Applause.)

The Chairman: I think it is acknowledged by every owner of a factory and the patrons that it is bad policy to ship green cheese. I would like to know what plan Mr. Ruddick would suggest to remedy this—whether by education, legislation, or damnation. (Laughter.)

A Member: I do not like to see the blame going on the salesmen, for I do not think the salesmen are responsible for shipping these cheese. I am pleased to see that we have here merchants from Montreal. They have agents coming right into the cheese factories, inspecting cheese, and they will say, "If you would like to ship that cheese to Montreal I will give you so much." And I think the blame is on these men who buy the cheese. (Applause.) We are always anxious to get the top price, and we are always afraid the market is going down, and when an agent representing a big firm offers a good price we do not like to refuse. (Applause.) Merchants in Montreal are to blame for allowing these green cheese to be shipped.

Mr. **Ruddick**: I said before that I considered the exporter very much to blame for encouraging the buying of green cheese, but I say the responsibility rests on the man who owns the cheese. If you are going to allow the Montreal buyers to run your business then let them run it, but you will suffer in the end. It would be a great deal better to refuse to sell them these cheese. (Applause.) The Chairman asks what is the practical remedy? You have simply got to recognize that it does not pay to do this sort of thing.

A **Member**: Some years ago some of the Montreal firms gave instructions to ship the cheese in right from the hoop, and I would like to know if you can give me an explanation as to the reason of the change. Have they found out they made a mistake in buying these cheese?

Mr. **Ruddick**: Yes, I think they have.

ADDRESSES BY MONTREAL CHEESE MERCHANTS.

Mr. A. **Hodgson**: I represent the Montreal Merchants' Produce Association, and Mr. Wieland follows me. We were both sent here to have a talk with you. The President would have been here were it not that the election is going on, and they are busy.

I have been in the business for thirty-two years, and I visit different parts of Canada. We want to meet the producers. Your business is to make cheese, and our business is to buy and sell them, and we are told frequently by farmers: "If you do not take it at so and so, somebody else will take it and pay more." Cheese frequently is shipped that is only eight days old or just out of the hoop. During the last two years a good deal of experimenting was going on with reference to the cool curing of cheese. It was thought that if you took cheese into a warehouse and kept it there, that that would be cool curing cheese, and they would come out all right. We are willing to trust ourselves as exporters pretty much in the hands of Mr. Ruddick or Mr. Publow, and at any time these men want to come into our warehouse they are welcome, and if they find anything wrong we are willing to take their advice.

This referee question was discussed by our association, and we have left it in Mr. Ruddick's hands entirely and in your hands. If you want a referee you will get one, and if not, you will have to take our inspection. But you can send Professor Publow down there, and if he says we are right you will have to pay up, and if he says we are wrong we will have to pay up. We have always given way to Mr. Woodward, and have done just whatever he said. If your President will write to Mr. Stanley Cooper, our Secretary, he will give you any information you require. I wish to say that we want to co-operate with you in this matter, and if you say you do not want a referee we are willing to take that position.

I congratulate you upon the high price that was obtained for cheese last year. We started the year short of cheese, and we started high, and kept right through the whole year. Some of us have cheese left yet, and we hope we will have a 14 cent wind up. We are also hoping for high prices next season, but that depends upon your paying attention to the instructions you have had here at this Convention. I was pleased with one thing all through the speeches, and that is that we have to have a high ideal. Keep that high ideal before you. You may think the standards are kept too high, but those are not a bit higher than they ought to be. Our association has accepted the standard arranged by the Dairy Commissioner. A man does not require much exertion to go down, but you have to work in order to keep up. If you want a high standard of quality in your cheese you must send a high standard of milk. I want to thank you for the kind invitation sent us, and to say that the Montreal Produce Merchants' Exchange is ready at any time to co-operate with you and do what we can for the benefit of the Association.

The CHAIRMAN then read the following telegram from A. A. Ayer & Co.:

MONTREAL, QUE., Jan. 10th, 1907.

D. DERBYSHIRE, *Eastern Dairymen's Association, Ottawa*:

Regret that circumstances prevented my attendance. Permit me to say that in my opinion cleanliness and proper drainage at farm and factory and creamery, together with efficiency of makers and buildings, should be the forward movement in Canada this year. Could not the Government through the head instructors take control of above and issue licenses of first, second and third class? Many farms, factories and makers are first-class, but inferior ones are lamentably numerous. Hope your Association will lead on these important questions.

A. A. AYER & CO.

The CHAIRMAN continued: I am very glad to see the reference to licensing of factories, a project brought forward at Belleville three years ago. We cannot induce the Government to take it up as a Government measure. This year we had a couple of sanitary inspectors appointed who did good work, and I believe we are working towards the licensing of factories, and we will practically have it this coming season.

MR. WIELAND: I think the main evil that has crept into the cheese trade and into the dairy industry is that you are actually selling goods under false pretences. That is, you are not selling cheese; you are selling curd. I do not think any cheese-maker would describe the cheese he takes down from the hoop on Saturday and sends to Montreal on Monday as cheese. Some man in the audience said, if we are offered a good price for this stuff we cannot be expected to withstand the temptation. You might say the same about selling cattle, and if a man thought a calf was a cow he would sell it to him for a cow.

I represent a firm in Manchester that has a capital larger than the Bank of Montreal. They did a business last year of $108,000,000, and I want to point out to you where you are going to lose business. The Canadian cheese which we handle amounts to four hundred thousand pounds sterling, (in the neighborhood of $3,000,000), and if they do not get the goods they want, they will buy elsewhere.

In 1906 I was in our cheese room in Glasgow, and I saw cheese that had never seen the inside of a cold storage. It was cured in the usual curing house in Scotland at a temperature of about 55 degrees, and that cheese was very fine. One of the greatest necessities in this business is cleanliness, and I believe that predominates all Scotch dairies.

A country from which you have taken a great many good leaves is Denmark. Surely Denmark has no more right to claim perfection than any other country. When they started in the dairy business they found that Ireland had the butter trade, and they had to capture it. It was not presented to them; they went about it in the right sort of way, and they got it. They have surprise inspections. A dairy may be visited in the middle of the night. Their butter ranks very high. The only things Denmark wants to bother with is butter, bacon, and eggs, and at the present time Canadian bacon is ranking very close to Danish bacon. I believe the vast majority of Canadian farmers would rather do a thing right than wrong, and you should adopt such measures that the minority will have to come in. You may call that compulsion, but I think you should have it.

We have had a great many complaints this last season of the cheese running off very quickly. We expect to lose on an average one-half pound per box per month on our cheese, and if we do not lose more than that we are perfectly satisfied; but when you carry a cheese two or three months and lose two or three pounds a box, it is a great loss at 13c. a pound. The quality of the cheese this season has been fair; the flavor has been clean, but it does not seem to give perfect satisfaction. You examine it and say you cannot find any fault with it, but they do not exactly like the flavor. It lacks a cheesy character on which they lay a great deal of stress on the other side. If you do not keep up the quality of your cheese the Englishman will get something to take its place. The principle will always hold good that the man who does not put up a good article will surely lose his good name. (Applause.)

The CHAIRMAN: No man in Canada has done as much for the dairy man as Professor Robertson, and I would like to have him say a few words to you at the present time.

Prof. JAMES W. ROBERTSON: It is very pleasant for me to come back after missing several years of conventions, to listen to the most interesting discussion of you men who are carrying on this business. Changes must come as time passes, but I find no change in the hopeful spirit of your President—and the next convention is always the best—and this has done much for Canada and for dairying. You may have heard of the English dairy maid that turned the milk sour by her smile. She must have had a very cross disposition. I have known men who kept back great national movements by their hopelessness and pessimism; by their want of faith and expectation; but I think Mr. Derbyshire, by his hopefulness, has helped the dairying business a great deal. Since I was at the first dairy convention thirty years ago, there has not been a great deal of change in the disposition between the buyer and the seller. It comes back to me that no man liveth unto himself, even in the cheese business. We must all hang together or we must all sink down together; and every cheese buyer who does his duty well, and every cheesemaker who does his duty well, and every farmer who does his duty well will help on the progress of this great industry. If a man makes only a mouse trap and makes it better than any other man in the world, then the world will come from every quarter for that mouse trap. A few years ago Canada began to turn out the best cheese in large bulk that went to Europe, and then the largest ships plowed through the sea to our shores to carry our cheese to England; and then they built larger ships and faster ships and they plowed a wider path to our shores, and now they are travelling a beaten path to Canada. Why? Because she has the reputation of having a climate and a people that make some things the best of their kind that the world needs, and that kind of service will always have recognition. We cannot grow wheat as easily in the North-west now as we did in the beginning, because they are getting weeds out there, and it is the same in the cheese business. We are getting more troubles than we formerly had. I welcome the Dairy Association to the enjoyment of the splendid reputation which has opened up, along which hundreds and thousands of people travel the seas to this land, and we can rejoice in having had a large share in bringing millions to this country. (Applause.)

The CHAIRMAN: Prof. Robertson is here because I went down to Ste. Anne and invited him. I talked the matter over with him and showed him that he must not lose touch with the people in this part of the Province. We can all remember when they would sneer at Canadian cheese, and when we sent 8,000 or 15,000 boxes from Montreal, and New York was sending 130,000 boxes a week. At that time we got Prof. Robertson appointed Dairy Commissioner, and he took hold of this work and reversed these things, and now we are letting New York send 8,000 or 10,000 boxes a week, and we are shipping 120,000 and 130,000 boxes a week from Montreal of the cleanest up-to-date goods that any country can make on the top of the earth. (Great applause.) Don't you think it is a grand time for me to drop out of this job? My heart warms when I think I have had just even a humble hand in connection with this dairy business. I expect great things from my successor, President-elect Dargavel, and I bespeak for him the co-operation of the dairymen of this country, especially Eastern Ontario. I am sure you will give him your hearty co-operation the same as you have given it to me, and if you do that the progress of the Canadian dairymen will be greater in the future than it has been in the past. (Applause.)

MISTAKES IN DAIRYING.

BY PROF. H. H. DEAN, O. A. C., GUELPH.

If I remember rightly, I have attended every session of the Eastern Ontario Dairymen's Association since I have been connected with the Dairy department of the College, and that is sixteen years. I have enjoyed the work, and I have enjoyed coming to your meetings. I have esteemed it an honor and a pleasure to meet with the dairymen of Eastern Ontario year after year. To one who is tied rather closely to College work it comes as a pleasant holiday to meet with the eastern and western dairymen year after year; in this way we get right views of life. The tendency of the man who remains in one place is to get narrow views of life; but, by coming in contact with men who are actually engaged in business, our views are broadened, and we come to appreciate men and their work at their true value. We profit most by our mistakes, and the man who tells us in a kindly manner that we have been making mistakes will do us the most good.

In my sixteen years' experience as a servant of the people I have had a great many opportunities to join the Echo Lodge of Society, but what we need in this work is men who have backbone. There are a lot of fellows who have a wishbone where they ought to have a backbone. (Laughter.) The man who is going to do his very best in whatever line of work he is engaged must have a backbone.

The first mistake to which I would call attention is that many of our dairymen are wasting their soil fertility, and, instead of giving you my own views on that, allow me to quote from a recent address by J. J. Hill, the great railway magnate—not a college professor, not a farmer, but a railway man. He said in a recent address before the American Congress of Agriculture: "All the people that exist upon this planet, all development of man, from the lowest to the highest quality, rests as firm and unreservedly upon the capacity of the soil, as does his feet upon the ground beneath. All industry must stop when the products of the soil are not forthcoming to furnish money for the pay roll. The one unfailing national resource, the sole asset, that does not perish because it contains within itself the possibility of infinite renewal, is the soil. The waste of that treasury in America has already deteriorated the value of soil for productive purposes more than it should have done in five centuries of use.''

That is what the far-seeing railway man has to say about American agriculturists. If this waste of soil fertility is so great as to strike a man who is engaged in another business entirely, how much more important is it that we farmers should give attention to this great waste that is going on in connection with our soil, everywhere in this country. We find, everywhere, men growing timothy hay to feed cows, and they might as well give straw. I was very much pleased when Mr. Glendenning brought before this convention the importance of growing alfalfa or lucerne clover. I have been making some experiments on my own farm of half an acre with reference to alfalfa. I consider it one of the best plants that the dairymen of this country can grow. I see no reason why the dairymen of this country should not cut the cost of milk production in half, if they will give more attention to this question.

The next mistake I wish to call your attention to is the fact that the average farmer is content with inferior animals on his farm. A man who is content with a cow giving 3,000 lbs. of milk is a man who does not understand the first principles of the economics of dairy work; and, until the dairymen of this country wake up to the fact that it is possible to get cows giving six, eight, ten, and twelve thousand pounds of milk in a year, they cannot hope to compete with the dairymen of Denmark and other countries.

The next mistake, which a great many of our dairymen are making, is with reference to the feeding of these animals. They do not give them sufficient of the right kind of food. There are men so generous that they will actually feed a cow on straw all winter, and then swear at her because she does not give more milk. The winter time, when most of the cows are dry, is the time to prepare for next year's milk production. There is nothing surer than this fact, if a cow runs down in flesh in the winter time she will not be a profitable milker during the next summer. That is one of the fundamental mistakes which a great many of our dairymen are making with reference to the feeding of cows. A great many farmers' cows are so thin in the spring that it takes them half of the summer to recover from the bad effects of the winter. There is another reason, and a very important one, that cows should be fed well during the winter time when they are dry. It has been demonstrated that the effect of poor feeding upon the progeny is very marked, and one of the reasons why many cows are unprofitable milkers is because they were not properly fed when they should have been. This is another of the fundamental mistakes which our dairymen are making.

Now, I come to the man himself. Froude, the great historian, says, "Take man at his best and man is a great fool." I was reading one of those great books of Froude's, and I read this sentence out to my wife, and she said she was glad that some men were able to appreciate men at about their true value. (Laughter.) We hear a great deal of talk to-day about the importance of cleanliness on the farm, and in our cheese factories and creameries. Well, I want to say that, in my judgment, one of the things that needs cleaning up is the men who are in connection with the business, and I consider this habit, which so many of our dairymen get into, of smoking and chewing tobacco is a disgrace. (Applause.) We hear a great deal of talk about cowy odor in milk. Personally, I would rather smell a cowy cow than a man who literally stinks of tobacco. (Applause.) One mistake which a great many dairymen are making is in connection with that very thing. Whenever I engage a man to work in the Dairy department of the College, I ask him if he uses tobacco, and if I can get a man who does not use tobacco I will pay him more wages than I would the other fellow. I hold that a man who has his sense of taste and smell vitiated and paralyzed by the use of tobacco cannot judge milk and butter and cheese, and, if I had bad flavored butter or cheese to sell, I would like to sell it to a man who uses tobacco.

Another mistake which our modern dairymen are making is in clinging to the old idea that aerating the milk is a good thing. When we preached aerating the milk eight or ten years ago it was as a result of a practical experiment, but we believe now that aerating the milk at the average barnyard does more harm than good. What is necessary is to get the milk cooled as rapidly as possible. It is a source of personal gratification to me that the idea of aerating milk has largely passed away, and that we have, taking its place, the more rational plan of cooling the milk. They are bringing up in connection with the cooling of milk one or two false ideas which I would like to talk upon. A man came into the dairy building last year and said he had a great thing for cooling milk. I told him to send up an apparatus, and he did so, and this is the result: 25 lbs. of ice, 25 lbs. of water and 154 lbs. of milk; temperature of the milk, 98 degrees; temperature of the room, 60 degrees; temperature of the milk after cooling, 84 degrees. It cooled the milk just 14 degrees. I asked our foreman, a good practical fellow, who is not afraid to give a report on anything we turn over to him, to do so, and this is the report he gave: "Awkward to put ice into; awkward to put in and take out the milk; occupies too much space; awkward to wash; not an efficient cooler; conclusion, total failure." There are serious objections to putting the cooling medium into the milk. One is there is great danger, if it be water and ice, that some of this will accidentally get spilled into the milk. There are people who would have an accident of that kind if necessary. There is always the risk of an accident, and then there is the second objection that, when you take it out of the milk, you are going to make a mess of the floor, because there is a certain amount of the milk bound to be running off this cooler, and I think it is better to put your milk into the cooling medium and not the cooling medium into the milk.

Another mistake is that of selling the products too cheaply. Science has demonstrated that one quart of milk contains as much nutritive material for the human body as one pound of beef. If you ask the ordinary man or woman to pay 10c., or 18c., for a quart of milk they would think you were robbing them, and yet science has demonstrated that a quart of milk is equal to a pound of beef. In Guelph we cannot get any kind of beef for less than 16c. or 18c. a pound. My own judgment is that the people of this country are waking up to the value of dairy products as food, and, instead of expecting to get milk for 6c. a quart, they will be willing to pay 10c., if the milk is clean. If the farmers of this country will produce clean and wholesome milk there are any number of people who are willing to pay 10c. or 12c. a quart for such milk, and they will not be paying an extraordinary price as compared with beef or any other food you can buy. I look for the prices of dairy products to be growing higher and higher, especially milk. (Applause.) Milk is one of the most easily digested things the human being can take into the stomach. If you are ill what does the doctor recommend? What does the child live on in its early stages? Milk, because it is easily digested, contains everything that is required, and it is one of the most valuable foods which we have for human consumption. One of the mistakes which our dairymen have made in the past is in thinking that they have been getting a sufficient price for their products whereas they have not been getting near their true food value. The more we know about dietary science —that is the science of feeding human beings—the more people will be willing to pay a higher price for dairy products. One of the speakers, Mr. D. M. Macpherson, made a valuable suggestion in this connection. We ought to have prizes in connection with every Township and County and every Provincial Fair in this country for the best milk and cream, and the best methods for taking care of that, and I do not think our agricultural fairs could spend money in a better way than by offering prizes for the best milk and cream.

Q.—Why not give prizes at the factory to the man that brings the best milk for a certain length of time?

Prof. Dean: I think that could be done. The man who takes good milk has no encouragement, because he gets no more for his cream than the man who takes in poor milk. I hold that is wrong, and we will never have very much improvement until we change that sort of thing, and encourage the men to produce and care for the raw material as it should be.

Another mistake that I consider modern dairymen have been making is in advertising to the world that we are not taking as good care of our milk and cows as we ought to. A woman made the following remark before the New York State Dairymen's Convention: "We should call attention to the virtue of our product, not to the vices we would be rid of." I hold that this is a sound business principle.

What I have to say just now deals with principles and not with men; and one principle is that the dairymen of this country have not given sufficient encouragement to the men who are engaged in original research, and in helping the cheese and butter business of this country to get on a better footing. Dr. Welsh, at the opening of the new medical building at Harvard, said: "Men count for more than stately edifices and all the pride and pomp of outward life; research is not to be bought in the market places nor does it follow the commercial law of supply and demand." A man, who left one of our great Universities in the old land, said: "What are buildings and equipments if we have not got the right kind of men to look after the teaching of the work." I hold that is true of the dairy business to-day; you may have the best equipment that money can buy, but they all depend upon the men who have to handle them. (Applause.) The tendency is for the public to expect too much of the average college man. There is a tendency to criticize very strongly the men who are engaged in work of this kind. While we welcome fair criticism, when men attack you unfairly and expect things of you that cannot be done by mortal man, a serious mistake is being made. You can never have the highest type of a teacher and the highest type of original research man in one and the same man. It is just like expecting to get a first-class dairy cow and a first-class beef cow in one and the same animal.

In connection with the dairy business in this country we need one chemist and one bacteriologist who will devote all their time to bacteriology and chemistry in connection with the dairy. In every step in the whole process of cheese and butter making the cheese and butter maker will be all the better if he knows something about the chemistry and bacteriology. I hope something will be done in the near future to get more original research done along the line of dairying, and that whoever they select for that work will receive fair remuneration and be treated as they should be treated.

The CHAIRMAN: I have great pleasure in introducing to you the member for North Perth, Mr. A. F. MacLaren. He has been engaged in the dairy business for a great many years, has been President of the Western Association, and is one of the men who has done a great deal for the dairy business.

Mr. A. F. MACLAREN, M.P.: I must say I am delighted to meet the dairymen of Eastern Ontario, and I am delighted to see the rapid strides that have been made in the dairy industry in the Ottawa Valley during the last ten years. I very well remember ten years ago when I was first asked to judge cheese at the Ottawa Fair. I did not think very much of the exhibit, but during the last two or three years, I see a very great improvement, not only in quantity but in quality. I think you ought to be proud of Mr. Derbyshire, your President, for the manner in which he has held this Association together, and I am sorry to know that he is retiring from the position, because it will be hard to get a man with such long arms to hold you together. He never came up to our part of the country without praising this section, and the County of Leeds was always on his lips. I think he will acknowledge that he received many good lessons in the West. I think we are making a mistake by not mingling more with one another. I think you should have larger factories in the east than you have. It would be better to put two or three small factories into one, and then you could make fifty cheese almost as cheaply as you can make ten. I think you would make more money if you had larger factories.

Another thing I was impressed with was what Prof. Dean said with regard to running down our own milk and cheese. I happened to be in Edinburgh when the report of the meeting in Montreal about bad milk came out, and one remark was that one man would not eat his own cheese, and I heard a very hot discussion in Edinburgh, with regard to that very article. I sent a copy of the *Scottish American* to our head inspector in Western Ontario, but I never heard any more about it; but I thought it was a very bad thing, and it happened at the very time when there was all that objection about canned meat. I happened to be in Germany and Austria and France when all that agitation was going on, and in Scotland and England, and many stores where I inquired they told me they had stopped almost altogether selling canned meats on account of the bad reputation it got, and I thought it was a very bad time to say anything about Canadian cheese.

I also agree with Mr. Dean when he says the time for cheap milk and butter and cheese has gone by. I think, as long as you keep the quality of your milk up, you will never again see a low price, because people are getting better pay, labor is getting higher, and they can afford to pay for quality. You make a great mistake in allowing your cheese to be shipped too green. (Applause.) At one place in Scotland, at a little village called Kenmore, I used to go into the store every day, and I was ashamed of the Canadian cheese I saw there, because they were dry and chippy and hard and green, and not fit to be shipped from Canada. On the other hand I found plenty of magnificent cheese from Canada, but the great trouble with most of our cheese was that they were too dry and harsh. If you make your cheese fat and rich in flavor you can sell them. I would strongly advise making soft cheese with more moisture, and have it retain its flavor by curing in cold storage, and then you will advance the name of Canadian cheese. (Applause.)

I was on my way to Carlsbad, and I read in a book about a great professor, Karl Von Nourden, the greatest dietetic doctor in the world, and I went to see him. I took the train at Cologne, and sailed up the Rhine. I called up the Doctor by telephone, and he said, "I am leaving the city, but I will be here for two or three minutes, and if you will take a carriage and drive up I will examine you." The first thing he did was to ask me where I was from, and I said, "from Canada." He said, "What is your name"? I thought I was in for it then; I had to acknowledge my name was MacLaren. "Well," he said, "You are not the cheese man?" and I said I was. I was very much surprised, after getting through, when that honest German doctor only charged me the nice little sum of $7.50. I expected it would have been $500.

FIRST PRINCIPLES IN DAIRYING.

By Dr. Jas. W. Robertson, of Macdonald Agricultural College,
Ste. Anne de Bellevue.

It is pleasant again to come before men with whom one has worked so many years, and it is pleasant to be able to hope that the calamity that may overtake our dairy business, is far in the future. It was once very cold on this spot. One of these scientists, who works for the Dominion Government, said that not so very long ago this spot was covered by 2,000 feet of ice. He did not add the inches, but I am quite sure about the 2,000 feet. Then by and by cold storage was a thing of the past. It was a tradition of the people, and then there came that matter of cooling off things by the water process, and it may be possible that this spot will again be covered by 2,000 feet of ice.

It is only a few years since I was here before trying to satisfy myself that I had something worth saying to you. These conventions are instructive; they bring us information which becomes an instrument in our hands and our minds for further domination or supremacy over the material ends we control. More than that, these conventions are good in other ways. The best thing that a convention can do for the people is, not to increase the crops, although that is good, not to increase the products, but to increase the thought power of the people. The destiny of Canada depends upon the thought power of its people (applause), and you who are following dairying must think of increasing the thought power by which you manage your own business and help on the affairs of state.

Since my friend, the President, is about to retire, I would like to take time for one or two sentences to tell you my appreciation of the capital work he has done for Eastern Ontario and the Eastern Townships, and regions far beyond these places I have named. (Applause.) It is not every man who would give all his time so unselfishly as Mr. Derbyshire has. It is not every man who has the enthusiasm that can light up into activity, the dormant powers of other people. I would rather be a small rush tallow candle, that would light up the soul of some small boy sometime, than be an electric light by itself that would dazzle people's eyes. Wherever you go you will find men of various kinds all speaking well of our Dan. (Applause.) He is just a little more than a man; he is a dairy institution, conserving in himself much of the pleasant history of this Association, embodying in his own personality much of what it has done for the farmers and cheese and butter makers and shippers of Ontario, and leaving behind him in his chair traditions which, I believe, his successor will worthily try to improve upon, because he is also a man, and we expect improvement in his successor. I say we are sorry to part with Mr. Derbyshire, but glad that the Association have enjoyed his *regime* so long with so much good to themselves. (Applause.)

We measure progress sometimes by mile stones. I go away back to the time Mr. Ruddick spoke of this afternoon, when the first cheese was shipped from Canada—away back in 1866, when the shipments were sent mainly in old flour barrels, for at that time these were the cheese boxes. I knew men who shipped cheese in flour barrels for many years, and I have sold cheese to them and made cheese for them. The exports of cheese and butter in those days were very small, in all $2,000,000—chiefly butter. By 1876, the value of our exports had risen to $4,000,000. Then there was a conspicuous mark of progress when our dairymen went down to the big Centennial in Philadelphia and showed their goods, and I think you will remember how creditable the showing was to these people, and how much encouragement they got. My friend MacLaren was one of the unpaid instructors in those days. I remember him coming to the factory in which I made cheese and telling me some things that were helpful to me and valuable to me. (Applause.)

Then in 1886 the exports had risen to about $6,000,000. At that time there was but one Provincial dairy instructor. I was appointed to the chair in the Ontario Agricultural College. That was fully twenty years ago, and I begin to feel that I should not be longer a boy. The exports of butter were then about $6,000,000. Then in 1896, the value of cheese and butter had come to about $15,000,000, and in the next ten years, 1906, the value of butter and cheese came to about $30,000,000, so you see the tremendous progress of quantities, and some corresponding progress in quality, in ability, in reputation, and in revenue.

I want to say a very few things about some of the first principles in dairying that need to be our standard, that younger men may be encouraged to try their best to make a success of life in dairying. The first principles with regard to this business are very much like those in all other occupations. Some men think that in time you can get something for nothing. It is all right, but that is one of the besetting sins. Man never creates anything unless it can be said he makes a fool of himself. (Laughter.) He never can entirely create anything, but to him is given a large measure of controlling, of shaping, the forms of things, and determining the use of things. Every school boy knows that in the conservation of energy there is no waste of energy; that the heat of the sun that puts itself into the corn stalk, or into the wheat end, is not clean waste. It is not man's concern to let the sun play idly; but he wants to so work the land that the sun will have a good effect, and a man's chances can be wasted by letting the sun's heat go to waste so far as he is concerned. The conservation of energy is tremendous. There is a conservation of energy and a ceaselessness of motion. The atom which was once thought the ultimate division of matter has been found to be made up of infinite parts in ceaseless motion. Think of this, and the unsleeping intelligence controlling it all. Love of a man's labor sets the pace for his progress. Let me give you one or two instances of the application in this direction of intelligence. Some years ago it was my happiness to be able to encourage boys and girls in Canada to pick out the heads of the most vigorous plants on their fathers' farms. After three years of working, the heads sent in represented 28 per cent. more crop. That was the direct result of intelligence on the part of the boys who did the selecting, and only the other day, a great man, whom I esteem, Professor Hays, Assistant to Secretary Wilson, of Washington, one of the great men of the continent, said, after his long experience and work in this matter, that the crops of America would be increased instantly, 25 per cent. if selected seed were sown with three years' selection behind it. What does that mean, to gather in 25 per cent. more grain, not by doing any more plowing or putting any more fertilizer, but by intelligence through the selection of the seed.

In the Province of Ontario alone there is 5,000,000 of acres sown annually to grain. I should say four-fifths of that is fed to cattle and horses. Look at the tremendous impetus it would make if you get 25 per cent. more grain. Mr. Grisdale has made it clear that 25 per cent. more crop can be got by proper rotation without any more labor. What would not we do in this Province, by way of shouting, if, by any magic we could bring into farmers' granaries $25,000,000 worth of grain in a year without doing anything for it.

When a farmer ships out of Canada a hay crop from 200 acres of land, he has caused to be sent out of this country more plant food than was sent away in our whole $6,000,000 worth of butter. That is a fact. The dairyman who exports butter is a safe man for the land. He makes the land itself a secure storehouse for the enrichment of future generations. The soil is the habitation of myriads of living things. You may say insignificant; but certainly not at all insignificant compared to what I am. The tiniest microbe of the soil is a majestic power compared to what I am. What can they not accomplish for the evolution of making things ready for something better than themselves? That is the meaning of plant population,—the bacteria—in soil, to prepare those obstinate substances so that the tiny, tender, soft roots in plants can get them and lift them up into the sunshine. It is man's part to take care of these small things and let them do their best.

Then there is the question of cattle. These cattle-testing associations are valuable, but they do not go far enough, and that is not complaining of what they do. What does the cow-testing association do now? It excludes the bad, and weeds out the poor; but we must go much further than that and improve the good. I do not care for the man who is all negative. I do not care for these negative people, this negative cheese, these insipid things that have nothing bad about them. They would be all right in their way, but I want a positive thing. I want cheese that is good; that is cured a long time at a low temperature. (Applause.) We want, not merely the absence of poor cattle, that may be brought about by testing associations, but we want the presence of good cattle. It is very difficult to know how to get them, and the only way to do it is by selecting and breeding.

I have now four years' selection of chickens at Ste. Anne's. They lived through this winter in a single board house, 25 below zero, and in their little colony house they get no mashed feed. We have not time to make it for them. They eat snow when the water is frozen, and they do not do so badly. I had six last summer at my house, and they laid an average of five eggs a day all summer, and 250 of these pullets now are laying 100 eggs a day in this weather, and eggs are quoted in Montreal at 70c. a dozen.

Q.—How high is that pen?

A.—It is about 20 feet by 10 feet wide, one door and one window, and a floor and a good deal of straw in it. With four years' selection that is what they do. There is a lot in feeding.

A quart of milk is always worth more than a pound of meat in a house, because it does not require preparation; it is more digestible and all round better value in every way. A pound of cheese, well made and cured slowly, is always worth 2½ pounds of the best beef you can buy.

I spoke to the nephew of Pasteur the other day, and he had only one thing to say. What the people want is to have the things kept clean. They do not want any pasteurising. It is all foolishness to pasteurise things that can be kept wholesome by being kept clean. There is an old saying that is entirely wrong, "A little knowledge is a dangerous thing." I would rather say, "A little stupidity is always a dangerous thing, but the least bit of knowledge is a wonderfully nourishing and comforting thing;" (applause) and the largest knowledge is only a little knowledge after all. A little knowledge is not a dangerous thing, but a little stupidity is a mighty dangerous thing. Let the boy get a little knowledge about everything, and let him be trained so that he can escape stupidity. How do you train him into that? Let him grow naturally by doing the things that his faculties call for, physical movement, manual labor, manual skill. How often intelligence is instructed by manual dexterity, and the boy who is taught to handle things and to use things is bound to make an active, intelligent man.

How can a man serve all the people? Did you ever think of the only man who served all the people? "Suffer little children to come unto me." There is the possible service,—serving all the people by serving the children who will rise up and become teachers and trainers of children. That is why the work of one man, called Sir William Macdonald, was put largely at my disposal, not to thwart anything, but to support the new institution serving the people in a far richer way. He would like to have a chance to serve the part of Eastern Ontario that geographically lies contiguous to us. He would like to train teachers into ability to carry on school gardens, nature study, sewing, cooking, and housekeeping—teachers who can go back to the schools and teach these subjects. How much do we want for it? Just the cost of what the teacher eats while she stays with us. We do not want any revenue; it is free to every teacher in this Province.

If you go to Ste. Anne's you will find that we have a mile square of ground. The cost of buildings and equipment was a million and a quarter of dollars, and every dollar spent as savingly as Scotch thrift could make it go. We put up buildings worthy of our faith in the future of agriculture. There is not a wooden joist in the buildings; they are all built of steel and concrete and are built to stay. We have the best ventilated college and residence buildings and houses for the pupils and teachers, barns for cattle, pens for the hogs, and houses for chickens. We have not been stinted in it. One job, that I thought would cost $12,000, according to the estimates, cost $5,800. That is all free to the farmers of Eastern Ontario in agriculture and horticulture and dairying and poultry-keeping. You will be as welcome there as the sunlight. You can come to our short course or long course. We have eleven acres of flowers. The glass for our windows cost us $16,000 more than common glass, because we wanted to have clear windows for the pupils to look through. (Applause.) We are trying to increase the thought powers of the people, and I will be very glad if you will come down to see us in the summer time. We have room for 400 now, and we can fit up accommodation for 150 more. Every building was put up with the idea of extension. It is worth while doing these things for the boys and girls. We read the old injunction, "Lay up for yourselves treasures in heaven where neither moss nor rust does corrupt." What do I mean about heaven? It is not some far off region. "Of such is the kingdom of heaven." Lay up for yourselves treasures in the thought power and in the intellectual power and spiritual power. That is where neither moth or rust will corrupt, and where thieves do not break through and steal. That is where Mr. Macdonald's millions are invested, not in buildings, but where neither moth nor rust do corrupt, nor or where thieves do not break through and steal. Send some of your household treasures that way and they will be polished and made brighter and better.

Dr. JAMES FLETCHER: I am very glad to be here at your thirtieth convention, and I congratulate you that your Association is stronger to-day than it ever was before. I congratulate you that, although Mr. Derbyshire is retiring, you are able to put another good man in his place; but I hope you will never get away from him and that he will never get away from you.

REPORT OF INSPECTOR J. H. ECHLIN.

I have much pleasure in presenting to you my report as Sanitary Inspector of Cheese Factories and Creameries for Eastern Ontario. I began work on the first of June and finished on November 30th.

The territory allotted to me was that portion of the Province lying between the County of Hastings and the boundary of Ontario and Quebec, in all 12 counties, and in this territory some 667 factories are located. Of this number I succeeded in visiting 560 before the close of the cheese season, that is, Oct. 31st, the month of November being occupied in making a second visit to some of the places, where work of a special nature was to be performed in order to comply with the recommendations made during my first visit, and in holding meetings with the people to discuss the conditions as they existed in their particular sections.

I found that much good could be accomplished in this line of the work, and invariably found the people very willing to improve their factories, or, in the case of private enterprise, to advance the price of manufacture to enable the proprietor to do this; and it is very gratifying to me to assure the Association that a very great deal of credit is due the farmers and dairymen of this country for the live interest they have taken in the work during the season.

I might say that much of the Cornwall section was visited a second time, and I was greatly pleased with the earnest way in which the people entered upon the work of improving their factories. The opening of 1907 will find a great change in the appearance of a large number of the factories in that section.

I also visited the Renfrew County and Vanleek Hill sections a second time for the same purpose for which I visited the Cornwall section, and found that many important and valuable alterations and improvements had already been begun.

Many encouraging reports have come to me during the past month from every section of my territory, and I beg to assure you that scores of factory buildings will be greatly improved between now and the opening of the season of 1907. Many of them give promise of being, if properly manned, in a thoroughly sanitary condition, and fit for making an article of human food in, which is much more than could have been said of them in the past.

I might say that I was expected to visit the patrons of factories as well as the factories themselves. For different reasons, however, I was unable to take up this feature of the work to any great extent. In the first place, the extent of territory I had to cover, and the number of factories I had to visit, practically precluded my doing this; and, furthermore, in many instances it seemed useless to ask the patrons to improve the conditions at the farms until the factories were put in a more sanitary and cleanly condition.

During the early part of the season considerable improvement was made on some of the buildings, and in several instances a better water supply was provided, although in many places the shortage of water was a great hindrance to the makers in the way of keeping their factories clean.

One of the most frequent evidences of carelessness on the part of proprietors, patrons, and makers was the filthy condition of many of the whey tanks, and I feel that it is an insult to the women of this country to ask them to clean the milk cans after we have filled them with the whey from such tanks.

The nature of the improvements called for in the case of many factories was such that the work could not be done until the close of the season. For instance, the condition of many factories called for the laying of new floors; while that of others necessitated the lining and painting of practically the whole interior.

Thus far I have spoken in a somewhat general way, and I would now ask you to bear with me while I briefly present the following data, which will, I hope, prove both interesting and instructive:

As already stated, my work of inspection began on June 1st and terminated on Nov. 30th. During this time I inspected 560 factories. Of this number 18 might be considered first-class places, having all necessary appliances and well kept inside and outside; 116 good sound buildings were visited, 92 having really good sites. I found 203 factories having a good, pure and abundant water supply, and 63 having splendid drainage. I found the whey tanks at 52 factories clean and tidy and apparently well kept.

During the summer I visited 65 factories which were not receiving any instruction from any of Mr. Publow's staff of Instructors. Amongst all the factories visited by me during the season 35 buildings were considered to be entirely unfit places for the manufacture of cheese, and 78 new floors were asked for; while the interior of 209 make-rooms require overhauling by ceiling, lining, painting, etc. I have a personal knowledge of the water supply at 32 factories being improved during the season, and of several new buildings being erected to replace the ones destroyed by fire during the latter part of the season, so that we have every reason to look forward to the opening of 1907 with a great deal of pride and satisfaction.

J. H. Echlin.

The Chairman: I am sure we are all very much gratified with Mr. Echlin's report. He has always been a live energetic man possessed of more than an ordinary amount of common sense. We are very much gratified with his report, and the work he has done during the past season.

Moved by J. R. Dargavel, seconded by L. Patton that "Whereas the Dominion Government has announced a decision to discontinue the operation of the cool cheese curing-rooms established in 1902, on the ground that they have served the purpose for which they were intended, resolved that this Convention place on record its acknowledgment of the great value of the illustration which they have afforded, and the impetus which, through their operation, has been given to a most important movement for the betterment of the Canadian cheese industry, viz., the cool curing of cheese. Carried.

Moved by E. Kidd, seconded by Mr. Hume, that the heartiest thanks of this Association are due to Mr. E. G. Henderson, Manager of the Windsor

Salt Works, for the very handsome badges which he has again supplied officers and members of the Association, and for the very material assistance which he has rendered this Association from time to time. Carried.

Hearty thanks were also passed to the press, the railways, and the Council and business men of Ottawa for courtesies shown.

ELECTION OF OFFICERS.

The report of the Nominating Committee was received and adopted. The list of officers is given on page 5.

Mr. Derbyshire: I met the new directors in an informal way last night. I think it was about 2 o'clock when we got through discussing matters for this year's business, and I was very much struck with the intelligence of these young men who were elected to these various positions. I was very much pleased with their style, and they are going to be a great acquisition to us. I believe they are going to help us in the future, and co-operate and work with us as heartily as we have worked in the past. Last night I was presented with a gold-headed cane, and I was completely taken off my feet. I will preserve it as long as I live as a memento from this Association, and I will hand it down to my children, and I hope that they will hand it down to their children's children. I appreciate it more highly than anything I have ever had in my history, because it shows that the work I have done in connection with this Association has been appreciated by the men who have been most closely identified with it.

DAIRY INSTRUCTION AND SANITARY INSPECTION OF FACTORIES and CREAMERIES.

The following was read by the Director of Dairy Instruction, Mr. G. A. Putnam:

The dairy instruction of the past few years has resulted in a marked improvement in the general equipment and sanitary conditions of factories. Many proprietors and makers have, however, stated to the instructors and members of the Dairymen's Associations that they were somewhat discouraged after going to the expense and trouble which were found necessary to make the improvements considered essential by the dairy instructors. "We have gone to considerable expense in order that the quality of cheese may be of a higher standard, but our neighbor factories have gone on in the same old way manufacturing along cheap lines, and they, for the most part, secure as high a price for their cheese as the better equipped factories. In many cases the poorly run factories manufacture for a lower rate than a well equipped and improved factory thus making the burden still greater for those who are anxious to do what is essential if the industry is to be placed on a sure and permanent basis."

The sanitary inspectors for the past year, Messrs. J. H. Echlin and T. Dillon, have effected a marked improvement in the sanitary conditions of the factories. They went out from the department clothed with authority to insist upon improvements which were necessary and which had, in many cases, been recommended by the instructors, but which had not been made.

Many expressions of appreciation of the work accomplished by these inspectors have been received from all sections, and the better class of dairymen throughout the Province are strongly of opinion that work of this nature should be followed still more closely during the coming season.

The representatives of the dairy associations, and the chief instructors as well as the regular staff of instructors are of one opinion as to the advisability of clothing the instructors with the power of sanitary inspectors, and so arranging the districts that every factory and creamery will be subject to regular and systematic sanitary inspection, and may have the benefit of instruction as well. In order that the opinions above expressed might be put into tangible form to be placed before the Minister of Agriculture, the Director of Dairy Instruction called a meeting of the chief instructors, sanitary inspectors, and representatives of the two dairy associations to meet in Toronto, on the 8th inst. Those present were Chief Instructors, G. H. Barr and G. G. Publow. Sanitary inspectors, T. Dillon and J. H. Echlin. Representatives of Eastern Dairymens' Association, R. G. Murphy, J. R. Dargavel, M.P., and J. H. Singleton. Western Association, Thos. Ballantyne, Jno. McLevin and J. N. Paget. After discussing the subjects before them at great length they unanimously decided upon the following system.

(1) That the whole Province be divided into such sub-divisions as would give each inspector from 35 to 36 factories or creameries. This will require a staff of 38 instructor-inpectors, and it is considered by those who have had the work in charge that the men appointed to the work would be able to render more effective service than in past years. Many of the better factories are really not in need of regular instruction, and in the majority of cases a call of an hour or two from the instructor will be just as effective as to spend a whole day with the maker in manufacturing a lot of cheese. This will give the instructor-inspectors an opportunity to visit many of the farms, and to advise with the producers as to the best method of producing the desired quality of milk. In the opinion of the chief instructors the chief essentials in producing a first-class article is that the raw material receive proper attention by the producer and milk hauler. Chief Instructors, Barr and Publow stated that "90 per cent of the rejections can be traced to inferior raw material."

(2) That every factory and creamery in the Province be charged a uniform fee of $12.00 to help defray the expenses to the Department of furnishing instructor-inspectors. The total appropriation necessary for the work suggested by the joint committee is $42,700, and upon the basis of the $12 tax above mentioned, the factories and creameries will contribute $16,000 towards this expenditure. It was at first thought that a sliding scale would be more equitable, but after discussing the question from all sides it was decided to recommend a uniform fee, chiefly for the reason that the smaller factories and creameries are usually in need of a greater amount of instruction than the larger factories and really demand as much or more time than the larger concerns.

(3) That the instructor-inspectors be required to test milk and cream for adulteration or tampering, but only in those cases in which application is made, and the maker or some other responsible person furnishes the department, or one of the chief instructors with evidence that adulteration or tampering has been practised. In some sections the time of the instructor has been almost entirely taken up with the work of testing, and it is considered by the representatives of the Associations and the Department, that the persons identified with the factory should be qualified to make prelimin-

ary tests and investigations sufficient to furnish evidence that tampering or adulteration has taken place before the services of the inspector be asked for.

(4) It is also recommended that any owner or manager of, or assistant in a cheese or butter manufactory who shall knowingly receive or make into cheese or butter any milk or cream that is tainted, gassy, over-ripe, or delivered in rusty or unclean cans or utensils, or in which a preservative of any description has been used, or which has been drawn from cows suffering from lump-jaw or other infectious disease, shall be liable to a fine. We now have a provision under which the producer can be prosecuted, provided he sell or suply to a cheese or butter manufactory any milk that is tainted or badly soured, and it is thought to be distinctly in the interests of the industry to have a provision by which a maker or proprietor can be dealt with, provided he accepts any such milk to be manufactured into a food product for general use. This will have the effect of practically prohibiting a maker from accepting milk of inferior quality which has been refused at a neighboring factory.

It must be remembered that the above are recommendations made by the joint committee to the Department, and the same are being published at this time in order that the comments of the dairymen generally may be secured before definite action is brought. The Department is desirous of doing only that which shall be in the best interests of the cheese and butter industry of the Province and wishes to adopt such measures as are necessary to secure the same, but at the same time, wishes to avoid doing an injustice to any person or persons. It must not be inferred that instruction is to be abandoned and an army of men sent out merely to give orders to the men who own the factories and herds of the country. It is the desire to so rearrange the work of instruction and sanitary inspection that it can be done most effectively at a reasonable cost, and in the best interests of the owners of factories, the producers of milk, and the makers.

The Director of Dairy Instruction, Mr. G. A. Putnam, would be glad to receive suggestions or recommendations from dairymen regarding the proposed regulations.

Mr. Putnam: Your joint committee have made these recommendations. I am not speaking as a representative of the Department, but as one of the committee representing the Association, and what I say is not under the authority of the Department. I cannot promise you that the Department will pass these laws, or adopt these measures, but I hope this Association will bring these matters before the Department in as strong a form as possible, and impress upon them the necessity for the regulation. There is no person who does not appreciate the necessity for some steps which will insure a uniform method throughout the whole country and uniform high quality of product. Whatever method is adopted we must make some change in order to accomplish the end in view.

It is true that we are gaining ground from year to year, but the gain we are making is not what the chief instructor considers satisfactory at all. You, as an Association, have to remember that this method increases considerably the net cost to the Department, and you have to approach the Department and secure an increase of funds. If I had the dealing out of the money I would give you all they got from Cobalt. This is the place where we come to formulate our ideals for the year, and after we have formulated our ideals, then our ideals will make us during the year. If we hold up to a high ideal at the beginning of this dairy year, and work towards that, we can rest assured the year will be a profitable one. I would like to see this matter discussed. There are two sides to the question. I recognize that the great majority are in favor of these recommendations as they stand. However, I know representations will be made to the Department by interested persons against the recommendations. Take the individual factory man, and he can make out a pretty strong case against these regulations, and I trust your Association will put the case as strongly as possible before the department.

Mr. **Derbyshire**: This means that we are going to reduce the price of inspection from $15 to $12, and we will make everybody come in and pay $12. (Applause.) We are anxious to have some control of every factory that is making cheese in this country, because our product is coming before the world, and we want it to be the finest in the universe. I think the instructor ought to have $1,000. We want the best men in Canada, and we want to pay them enough so that they will feel that they are getting paid. It will never do for us to pay them a salary so small that they will want to leave us and go into something else. That will never do. We want to give them a price that will keep them in for the profession, and keep them in touch with us. A man will never do the best work if he feels that he is not properly paid.

Major **Redmond**: I think you had better let this question be laid over to be discussed by the people. It is not unanimous in this country. I was sent here to oppose that resolution by two or three cheese-makers who are not willing to pay the price to be inspected. They can do good work themselves.

Mr. **Derbyshire**: You know, Major, no man can live unto himself.

Major **Redmond**: What are you going to do with a factoryman who says he does not want an Inspector, and that if he comes to his factory he will kick him out?

Mr. **Derbyshire**: We will turn him out of the synagogue.

Major **Redmond**: If you have from 30 to 40 patrons who say, "Go on; we will back you up," what then? I think you had better leave this to the people. I do not like so much Government interference with the intelligent people we have in the dairy business. I think there are a great many who know how to run their own business, and in the section of the country where I live it is not a popular movement. I cannot say the people will be in favor of it. If we are forced into it we will make trouble.

Mr. **Derbyshire**: Provided we adopt this resolution you will have the pleasure of writing to the Government and everybody else in Eastern and Western Ontario can write to the Government, and send deputations and give them your idea. All we are doing is recommending this to the Government.

A **Member**: We must have compulsory legislation to make them clean up and do what is right. We have too many factories and too many cheesemakers who are inferior, too many inferior men. The Government should go ahead and make this compulsory. (Applause.)

Mr. **Alexander Hume**: I think this has been pretty well thrashed out through the whole Province, and to my mind the vast majority of people are in favor of it, because so many factories have again entered the syndicate, and I will therefore take much pleasure in moving the adoption of the recommendations.

Mr. **Kidd**: I have much pleasure in seconding this motion. I have recommended the syndicate system for 25 years. When we only had one instructor I was in favor of supporting him and would pay him with my own private funds. I think we are only getting things in shape and running order. I think every factory should support it. (Applause.)

Mr. WRIGHT, M.P.: I have no doubt from looking over the audience here that most of you are cheese-factory men, and perhaps you will like to hear some views from the creamery side of the question. I do not think we can find a single man throughout the length and breadth of this Province that would not say we should do everything in our power by legislation and by persuasion and by every possible way to promote the interests of dairying, and if it is absolutely necessary that some of the black sheep should be washed we will wash them. (Great applause.) If some of the men in this audience have had to go the way I have had to go to farms where they had cream separators, and see the places where the cream is separated, and if they saw the kind of cream delivered at the factory at some seasons of the year, you would begin to think that moral suasion was not enough, and that something else would have to be done. If we cannot get these people to do it willingly they must be made to do it. (Applause.) We cannot afford to let the quality of butter and cheese go down, but we must bring it up and up all the time. There is no limit to the demand for the best stuff. I could sell a carload of creamery butter a day at 27c. a pound if we could only have the right kind of stuff. I am delighted to know that the intelligent people of this meeting see the necessity for doing something and will carry this resolution. So far as I know, in my constituency, in South Renfrew, there is not a cheese-factory but will hail this thing with delight. If there is a small number who will not do the right thing they should be made to do it. (Applause.)

Mr. DERBYSHIRE: I don't want you to make any mistake by thinking that Major Redmond is a black sheep. He is only voicing the sentiment of his friends in that locality.

A MEMBER: There is no doubt that there are two sides to the question. Coercion is not a very nice thing to talk about. That paper Mr. Putman read is only a proposal. Think of the great amount of money that is being spent all over the country for the instruction of cheese-makers. Take any other industry and you will not find that there is the same amount of money spent by the Government for instruction purposes. I am in the cheese business, and if I am competent to run my business, why should I go and ask another man to help me? I have been running factories since 1875. There is no doubt that if a man does not want to employ an instructor it should be arranged so that he would not have to pay $12. When you come to look at it from a business standpoint it seems to me that it is a little arbitrary to compel people to do certain things they do not want to do.

The motion was put to the meeting and carried.

COOL CURING OF CHEESE.

BY J. A. RUDDICK, DAIRY COMMISSIONER FOR THE DOMINION, OTTAWA.

I intend to say a word or two on the cool curing of cheese, because so many men have asked me for information on this particular subject. I suppose that is because I have been actively engaged in promoting the work of the cool curing of cheese. During the last five years I have had excellent opportunities for getting information on the subject. It will not be necessary for me to take up your time discussing how to build a cool cheese curing room or how to manage such a place or what the result may be, because I may tell those of you who haven't received a copy of my last annual report, you can get one, and it contains full information on that point. Plans and specifications for building ice chambers and some information concerning different kinds of installation, and the tests we conducted last year, are really the only reliable data I know of on that point. There are three points connected with the management of these curing rooms.

I want to mention one particular point in connection with this matter. I have experienced rather more difficulty than I expected in making an impression on the Old Country market with cool cured cheese, and I want to show you how that has come about. You know that cheese have been delivered to these cool curing rooms in quite large numbers, I think 142,000 delivered in five years, but they have come from 104 different factories, so that there are a great many different lots of cheese. They have been bought in the ordinary way, one buyer buying one factory, and another buyer buying at two factories more, and so on, so that they have been taken by the buyers in apparently small lots. The buyers have found this difficulty, that they have not had a sufficient quantity of these strictly cool cured cheese to fill any order, so that they have had to fill in with other cheese to make up an order. That has been the difficulty, and it has been rather hard to overcome. Some of the buyers have brought in larger quantities, and have had more success by being able to fill whole orders with cool cured cheese, and when they were able to do that the result was very marked indeed. Many of these cheese have been bought in summer months and shipped in the season when they have been compared with fall made cheese, and in that way they have not always attracted the attention that they might; but we have found that the trade is wakening up. They are slow to wake up. They do not pay much attention to small quantities of cheese. It takes some time to make an impression on them, but last year I found that the trade in Great Britain was wakening up to the importance of cool cured cheese.

Another thing which was rather unfortunate was that there was a constant confusion or mixing up of the cool cured cheese with paraffined cheese. Very often the paraffined cheese was attracting their attention, and it was largely a question of paraffining in the minds of a great many, and there is no necessary connection betwen the two things. It was somewhat unfortunate that they became so associated. I want to read one letter I received unsolicited the other day, and it covers the point fairly well regarding the impression on the part of the British merchant as to the quality of cool cured cheese.

13 Greenwood St., Manchester, December 18, 1906.

Mr. J. W. Ruddick, Department of Agriculture.

Dear Sir,—On going through a line of white and colored cheese to-day, September made, all Western goods, we wanted a few hundred boxes for a very particular buyer. We got him fixed up, but he was not altogether satisfied with the quality, and kept repeating that they were not up to our usual standard. On going to the colored lots, we picked 400 or 500 boxes without turning down a factory, and our buyer expressed the pleasure that it was to have cheese of this kind offered; every lot was as near perfection as you can get cheese.

On going into the matter to try and find the difference, we at once saw that the colored had been cured in a Government cool curing room at Brockville, while the white had been cured in the ordinary way.

If any of your farmers had been in our warehouse to-day they would have had an object lesson in the value and importance of having their cheese all done in the same way. In our minds it makes a very much bigger difference than people imagine, and if this way was adoptd generally Canadian cheese would hold a very much higher place in the opinion of the trade than it does to-day.

Yours faithfully,

Wall & Co.

This is the opinion of one of the leading firms of Manchester. I think there can be no doubt in the mind of any person who has followed this matter at all, that it is very desirable thing that all our cheeses should be cured at a uniformly cool temperature. I am not going to waste time arguing that point. In Eastern Ontario there are some difficulties which no one realizes more than I do. I have realized it from the start. In this eastern part of Ontario, practically all the factories are owned by private individuals, and the result is that we have a ruinous competition. They hesitate to provide cool-curing rooms unless they are sure of being recompensed for it in some way. I have always appreciated that difficulty, but I have always taken the ground that if the patrons of these factories wished to secure the benefit of cool curing of cheese—and there can be no doubt of the benefit—then it is their duty to bear part of the expense, and I am glad to say that the patrons of some factories have agreed to do that. In Peterboro and Belleville and Prince Edward County Districts, there has been a very strong movement towards establishing cool curing rooms, and from information I received the other day I think that next season, in the neighborhood of Peterboro, Belleville, and Picton, there will be forty-one cheese factories fitted up with especially constructed cool curing-rooms. These factories are in a better condition to do things of that kind, because the patrons are the stockholders and they derive the whole benefit. I am sorry there are not more of the patrons of factories here to hear this point discussed; because I believe it is of great importance. Naturally the patrons of these proprietary factories take more interest in this question. It is not likely we will have as much improvement as we should have. Districts like Belleville, Peterboro, and Prince Edward, where they are going into this in general will soon make reputations for themselves. They will outdistance anything in this country. They have made wonderful progress already, and any exporter of cheese in Montreal will tell you that. I have often discussed this question.

I want to say a word or two as to the improving of our home trade, and the bearing that cool curing of cheese has on that trade. I mentioned yesterday that early in June last summer I had a number of small Stilton cheese made something like one hundred. They were made at two different factories, and these cheese were taken the day after they were made and placed in a cool curing-room and left there all summer. I believe that with cheese like these we could increase the consumption of cheese in Canada five or six times. We are overlooking a very important market in this Dominion of Canada. If there were six million of people on the other side of the earth that were cheese eaters we would be tumbling over some one else to get over to that market. Here at your doors we have overlooked it. We have no very definite statistics as to what the consumption of cheese in Canada is. Taking the figures of the census returns, we could make a calculation which is more or less an estimate; but according to that the annual consumption is about six pounds per head in Canada. The Western population, which is increasing so fast, is beginning to demand more cheese, and they consume a very large quantity of it. This food is particularly adapted to the prairie country where it is so difficult to get meat in the summer months. The trouble is that the great bulk of the cheese which is offered to the Canadian consumer is nothing but the culls of the country, and that is a great mistake. The people of this country do not want to eat culls; they want good cheese. People often ask me, "Where can I get a nice cheese?" and they say they would pay twenty-five cents a pound to be sure of getting a good cheese, and after I sold them one of these cheese they came to me and said, "Where did you get that cheese; that is just the kind we like and we should like to get some more." There is nothing special about this cheese at all. It is just ordinary cheese; cheese kept at a temperature that never went over sixty. It became mellow and cheesy in flavor. It is not insipid or neutral in flavor; it is cheesy. If I were looking for some business, I know nothing I would go into more quickly, and I feel satisfied that I would make money just by selling cheese like that.

I had some correspondence with the editor of the *Canadian Grocer* on this subject, and he wrote an article pointing out to the grocers how they could increase the consumption of cheese by dealing in the right kind. The editor afterwards said that he met a number of wholesale grocers, and they were discussing the matter, and said cheese was cheese, and it was simply a matter of a fraction of a cent on the price that decided them as to whether they should buy the cheese. Someone has spoken of the difference that was made in the trade at Gananoque by supplying their customers with well cured cheese. It was a great increase in consumption of cheese. Wherever you find a grocer that is giving this thing some attention, and who lays in a stock of cheese and keeps it in condition, he always gets a big trade. There is a firm in this city that make a special feature of that. They buy a large quantity of cheese in the right season of the year, getting only well-cured cheese, and always have that kind of cheese to offer customers, and they do a very large trade. You will know that if you get the kind of cheese you like you eat much more than you would eat if you got a sour, dry, bad-flavored cheese.

I go about the country a great deal, and I tell you it is very seldom I pick up a piece of cheese I want to eat. That should not be the case in a country that boasts the making of such fine cheese as we do. We must give this matter careful attention, and not supply Canadian people with culls. Those were June cheese that were kept all summer at a temperature that did not go above sixty degrees, and that shows the effect it would have on our cheese trade in this country if our cheese were handled in that way, as there will be no doubt they will be in the near future.

Mr. Derbyshire: Eight or nine years ago we used to put in fifty cheese at Brockville, then we got up to one hundred, then two hundred, and now a thousand, and they are all sold out before I want to sell them. We bought in a good many more this year, and they are going just like hot cakes. They are taking these cheese to be shipped to every part of the country, and I wish I had a thousand more than I have. They are consuming four times as much cheese in Brockville as they did before. They never ask about the price, but say, "Can you let me have a nice cheese?" and then I fix the price. (Laughter and applause.)

CO-OPERATION BETWEEN THE FACTORY AND THE FARM.

By J. H. Grisdale, Agriculturist, C. E. F., Ottawa.

I want to discuss the part that the cheese-maker or that the factory man can play in helping the average farmer to improve and to increase the output of his farm. In my observation I find that there is a very great lack of co-operation between the maker and the farmer. The farmer does not take very much interest in the maker except to see that he does not give him a few pounds short on his milk in the morning. He never knew him to give him a few pounds long that I know of. The maker usually thinks of the farmer as a man who brings him so much milk, and who ought to bring him a little more and a little better quality if he possibly can, and he has very seldom much to do with him. Now, I think we have been long enough in this dairy industry, and there ought to be a great deal more co-operation between the makers and the farmers. If the maker is a maker deserving of the name he should be a man among men.

A Member: He doesn't get enough pay.

Mr. Grisdale: We will have to remedy that. We are trying to do it all the time, and he is gradually coming up all the time. I believe that the educational work that is being done all through the Province by this Association will have its result, and we will see a greater measure of co-operation between the makers and the farmers in the near future than there has been in the past; and the greater that co-operation is developed the better it will be. The maker has a great opportunity in the factory district because he comes in personal contact with practically every man. If he does not meet him he sends in his report, and has an opportunity for making suggestions which will be invaluable. I want to suggest to the makers this morning some of the lines along which they can help the farmers by their suggestions.

In the first place let me suggest that you take a little more interest in the returns of every man who is shipping to you; show some interest. You have no idea what a wonderful help that is to the farmer. I speak from experience as a producer, and in observing the work done by a good number of makers. The good work that the good maker can do by speaking encouragingly to the farmer is wonderful. You do not need to do that to a man who is shipping you 5,000 to 6,000 pounds of milk a day, but even a word to him will have a good effect. It is the little chap we want to encourage; these fellows who have only 200 or 300 pounds a day, and who ought to send 400 or 500 just as easily. I know what can be done in that line. Let me give you an example of a maker in Nova Scotia whose career I have watched with very great interest. He started seven or eight years ago in a factory where he had 25 to 30 patrons, and they were sending him an average of 75 pounds of milk a day. They were as little interested in the dairy industry as you can imagine any one to be. At that time the prices were comparatively low, but he set right to work and got to know his patrons. He encouraged them, spoke to them about their work, and in that way he got the farmers thinking that he was interested in them, and that the maker was really trying to make a success of the cheese business. The result is, that he has now as many more patrons, and the patrons instead of sending him 75 or 100 pounds of milk are sending from 200 to 400 pounds. There is an example of what one man did, and there is nothing to prevent every maker in this eastern country doing similar work. All you have to do is to encourage them a little bit, and you will be astonished at the results.

Another way in which you can do good work is by taking an interest in these cow records that the Hon. Mr. Fisher, Mr. Whitley, and Mr. Ruddick spoke about. I was very much interested in my office this morning in going over the report from one of your directors, and I am sure that Mr. Carlaw will pardon me if I speak of his report. I find that he sent milk from twelve to thirteen cows to the factory, something like 137,000 pounds of milk last year; that is a record worth mentioning and a record to be proud of. Some of his cows have given almost 7,200 pounds of milk in nine months, and when we get cows that will do that why should we be satisfied with cows giving only 3,000 pounds? The cheese-maker and the butter-maker who is satisfied to let the farmer in his district keep on feeding that latter kind of cow, and say nothing to him about it, is not doing his duty;

and I think it is up to every one of you gentlemen to draw the attention of the farmer more and more strongly to the matter and try and get them to keep the right sort of cows. If you have not a cow-testing association formed in your district, and you can get any one interested in the thing at all, let us hear from you, and we will be delighted to do everything we can to help the farmer to keep records. You can get the scales from Derbyshire & Co., and from other firms in Canada. The cheese-maker might keep a few scales to sell, and he might keep these blanks. I would be only too pleased to send blank forms to every cheese-maker who would write me, and do everything to persuade him to circulate them among the farmers, and get them to keep a record. I do not think there is a district in the Eastern townships where we have not more or less of the farmers keeping these records. The cheese-maker and the butter-maker is a man who can organize these cow-testing associations by persuading the farmer to do it, and let me urge upon you not for the sake of the country, not for the sake of the association, but for your own sake to do this. Why are you getting small salaries to-day? Why do you not get more money and live better than you do? Because the factories are so small; because there is an insufficiency of milk; because you are not getting the milk you ought to; and because you do not take the interest in the production of milk that you should.

It is not enough to try and persuade the farmers that they should keep better cows and weed out the poor ones, but let me urge upon you and advise you to feed them. I want you to do something encouraging the farmers to be prepared for dry weather; we often have dry weather in the summer when the pastures dry out, and there is not one farmer in fifty who has made any provision to overcome that difficulty.

Q.—If you have not green feed would you recommend feeding bran in the summer time?

A.—Yes, but it is not as good as the green feed, and it is dearer. If you have sufficiency of grass probably a little meal would not do any harm; in fact, I have known it to do good.

HINTS ON CHEESE-MAKING.

By G. G. Publow, Chief Dairy Instructor, Kingston.

I never was better pleased with the Dairy Convention than I was yesterday. I was particularly glad to see so many cheese-makers and factorymen present. I do not think we ever had a convention where we had so many cheese-makers and factory owners present. I am sure there will be splendid results from this meeting here in Ottawa this year.

There is one thing I am particularly anxious about, and that is this moisture in the cheese. I said many years ago the man who could invent some rapid means whereby we could determine the moisture in cheese would make a fortune. What we are doing at Guelph, or whatever it may be, in inventing something that will do so is a splendid work.

There is only one way in which you can get the best results. It is better to aim to get the milk in proper condition than to try to remedy defects in the milk, but when we have got the defect in the milk we should know what to do to get the best results. I have said before that the men who produce the milk are the greatest factors in the quality, and there is no person who should be in a better position to tell the people just what they should do than the men who are handling the milk, for they know, and I was very glad to hear Mr. Grisdale speak to you the way he did.

I am speaking to you now regarding the quality of your milk. If you find the milk is not working to your satisfaction you know what is the matter. You know that if it is over-ripe, and you were to leave a certain amount of moisture in that over-ripe milk, what would be the result in that cheese. I want you to answer that question from the floor of this house. What would be the effect on the quality of the cheese if you leave the same amount of moisture in the curd from that over-ripe milk?

A Member: It would be acidy.

Mr. Publow: Be careful regarding the moisture. If you have any fault in this Eastern section in the making of cheese it is that you are not careful enough on that line, and if your cheese are faulted in Montreal it is due to the fact that they are not sufficiently firm when the acid comes on. That applies to this Eastern section, where it is due to your receiving over-ripe milk. In 95 per cent. of the cases of rejection from this section the cheese are of that character. We all know they are soft enough. But these cheese dry out after a while, and then they are acidy. What we want is to make soft, mellow, meaty cheese. You must have sweeter milk to make that kind of cheese. If you leave the moisture there you must draw less acid. We have no trouble with our cheese except in hot weather. Do you believe you are any more careless or indifferent in handling the milk in that weather?

To my mind there is nothing that could be done that will do more to improve the quality of our cheese—that is removing the acidity—than to get the milk to the factory at a lower temperature. Now you must have something cold to do it with, and the average farmer will not take time with water, so I would recommend the majority of people to put in ice. (Applause.) They will be making money for themselves and making conditions such as will give you a greater love for your work and you will be able to make better cheese.

Mr. McPherson: Would you not go further and advocate that every dairyman should put in ice?

Mr. Publow: I would like to go on record as saying that he is not properly equipped for carrying on his business, unless he has got some provision whereby he can control the temperature whenever he sees fit. I do not know whether Prof. Dean was picking at me last night. I have always said that the best way to prepare milk for the cheese-maker or for table use is to run it over a cool surface immediately after it comes from the cow. Unfortunately the appliances required for that are a little expensive, and the farmers feel they cannot buy them. I believe they cannot afford not to buy them. The next best thing is to put the vessel holding the milk into cold water or ice. Perhaps the simplest way is to put the cold cooling material into the milk, but it is a mussy way. You all know that farmers are scarce of help and they want to do things in a hurry. The mussiness can be overcome by having a pan. If every person cannot have the best let us have the next best. Get the milk cooled in some way.

I want to impress upon you that you should be the educators of the people. You know exactly what you have to make and that is fine cheese. I want you to be readers. I want you to inquire into milk conditions. Find out, as far as you can, what the trade demand and what they will pay the most money for. I would make green cheese if they would pay enough money for them. Our business is to make the kind of cheese that will bring the highest price, and I want the people themselves to enquire, and not be satisfied with 13c. I think that is a good price, but I do not think it is anything near its value. Last year I said early in the season that I believed cheese would sell for 13c before Christmas, and I was laughed at by the

Montreal men, but it reached 13c., and I hope it will never be below. The farmers' business is not to be satisfied with 13c., but to inquire "Can we make this cheese so that it will bring 14c.?"

Let us advocate the value of the goods that we are putting on the market and not find fault with them. Let us blow our own horn, if you like. Cheese is worth more than meat. The proof of the pudding is in the eating, and it is the condition in which these cheese go to the consumer that makes the mark. What the farmers of this country want is a strong demand for cheese at high prices. To maintain that high price is to have a high quality. That applies to home consumption as well as foreign trade. We could increase our home consumption 500 per cent.

We want to make the conditions surrounding the manufacture of cheese attractive so that the people in this country and other places will talk about the clean tidy places where the cheese is made and where the milk is produced, and about the clean tidy barn and the men who are producing the milk. I want every cheese-maker in this country to be clean, tidy, right appearing fellows, and I want them to keep their factory in a proper condition, making them attractive, getting the people to see the conditions in Canada are excellent and that you cannot find a dirty factory. We do not want them at all. You know what these miners did when the report of the investigation into the canned meat trade was given to them. They took off their hats and said "Hurrah! for clean Canadian cheese." (Applause.) Did we honestly deserve it? (Cries of "Yes, yes.") I hope next year we will deserve it. I hope every cheese-maker will go home from this meeting determined to do better than he ever did before. (Applause.) Don't come here and merely listen to what has been said. Pick out the things you see you will be benefited by.

Those of you who have been making good cheese should be slow to make a change. The farther we go away from certain principles the farther we have got to come back. We have got to hover around one thing. The kind of cheese the people want are clean flavored, mild cheese—close boring, if you like. They should be smooth and silky in texture, and the appearance of the cheese should be bright and attractive, so that the very first thing a person will see when they see it will be "I want a piece of it." Do you think a box that is rat eaten and mouldy, or cheese with a soft rind, is attractive? Just imagine cheese of that kind being put along side of bright looking cheese. Which is likely to tempt your appetite? If you make a bad lot of cheese pay for it like a man. If it is not fit for sale burn it, or give it to somebody to feed their pigs.

The people of this country do not mind paying a little tax for getting improvements; because the higher the price of cheese, the more prosperous the people of a country will be. There is not a citizen of this country who was not benefited by the high price of cheese this year.

We all want to unite in this work and make this industry attractive to ourselves and every person else. If you all do your best we will have the best year in 1907 we have ever had in this country.

The Chairman: I would like to draw your attention to *The Canadian Dairyman*. This is our paper, and these thrifty instructors ought to take that paper so that we will have fresh business in connection with our industry placed before us each week.

We have had the best addresses at this meeting that we ever had. (Applause.) Will you help us in this year, 1907? If every farmer who produces milk would give the least bit of attention to the regularity of milking, seeing that the cows had good water, and if you would have extra silos to open up when the hot weather comes, so that cows could be fed in plenty, it would be a good thing. I hope every factory-man will do the best he possibly can and try to produce more milk and a better quality and keep the factories in a better condition. I do hope that 1907 will be a great year in the history of Canadian dairymen of Eastern Ontario.

REPORT OF COMMITTEE ON PROPOSED DAIRY EXHIBITION.

To the Directors of the Eastern Ontario Dairymen's Association:

GENTLEMEN,—Your committee appointed last September at the time of the Toronto Industrial Exhibition, to consider the desirability and advisability of holding a national Dairy Show during the winter of 1908, begs leave to submit its report. Your representatives met at the Exhibition grounds, a committee from The Western Ontario Dairymen's Association appointed for the same purpose, and composed of Messrs. T. Ballantyne, Jr. President of the Western Ontario Dairymen's Association, Mr. J. N. Paget, of Canboro, Mr. John MacLaren, of Mapleton, and Mr. G. A. Putnam of Toronto. Mr. J. N. Paget was elected chairman of the joint committee, and Mr. H. B. Cowan, secretary. The representatives of the Western Ontario Dairymen's Association reported that the proposal to hold a National Dairy Show had been discussed by the directors of their Association, and all had pronounced themselves in favor of the holding of such a show. It was decided to canvass the exhibitors of dairy machinery and of dairy live stock at the Toronto Industrial Exhibition to ascertain their views in regard to the holding of the proposed show. It was further decided to approach the city councils of Toronto, Guelph, and Peterboro, to ascertain what assistance in the way of accommodation they would be willing to furnish, should it be decided to hold the exhibition in their city.

A canvass of the representatives of the dairy supply firms at the exhibition revealed the fact that they were enthusiatically in favor of the holding of the proposed show. All promised to make exhibits of dairy supplies and dairy machinery at the show, should it be held. Several promised to make large exhibits.

Some of the leading firms claimed that they would like to make exhibits at the conventions of the Dairymen's Associations as now conducted, but that the expense of making exhibits was too great, the number of people they would reach is too small, and the conventions do not last long enough. They pointed out that at such a show as is proposed, they would be able to reach the dairymen of both Eastern and Western Ontario, as well as from the other Provinces and the United States, as if properly conducted and advertised, a large attendance from distant points might be expected. They appeared unanimous in the belief that such a show was needed, and that it would afford manufacturers of dairy machinery and dairy utensils an excellent opportunity to make exhibits of their goods known to the people interested in dairying. Such of the firms as expressed an opinion in regard to the point where the exhibition should be held favored Toronto as first choice, and Peterboro next. The firms interviewed included D. Derbyshire & Co., of Brockville; The Sharples Separator Co.; DeLaval Separator Company; National Cream Separator Company; R. A. Lister Company; The U. S. Separator Company; National Cream Separator Company; Oxford Separator Company, and the J. B. Ford Company, of Wyandotte, Mich.

LIVE STOCK BREEDERS.

The exhibitors of pure bred dairy cattle at the Toronto Exhibition, also were unanimously in favor of the proposed show. Most of them promised to make exhibits of cattle. One Holstein breeder has offered to fill with his own stock whatever accommodations for cattle are provided. Several expressed the view that the dairy cattle interests at the Ontario Winter Fair are completely overshadowed by the beef interests, and that it is time that the dairymen broke away and held a show of their own. Among the breeders interviewed were Messrs. James Rettie, of Norwich; C. J. Gilroy & Son, of Glen Buell; A. C. Hallman, of Breslau; G. W. Clemons, of St. George; Alex. Hume & Co., and Wm. Stewart & Sons, of Menie; R. R. Ness, of Howick, Que., B. H. Bull & Son, Brampton; David Duncan, of Don; Robt. Tufts & Son, of Tweed, and T. Porter, of Carleton West. It was the opinion of most of the breeders that the Canadian Ayrshire, Holstein and Jersey Breeders' Associations would be willing to arrange to hold their annual meetings at the time of the National Dairy Show, should it be held.

ACCOMMODATION.

A strong deputation, composed of members of the joint committee, and a number of leading breeders of dairy cattle waited on Mayor Coatsworth of Toronto, explained the idea of the proposed show, and asked what accommodation might be expected from the city, should it be decided to hold the show there. Mayor Coatsworth evinced considerable interest in the project, but has since written the secretary of the joint committee that the members of the Board of Control, to whom the matter was referred, gave it but "little or no encouragement," and that the members of the Exhibition Association "treated it in very much the same manner." The editors of several of Toronto's leading papers, who have been made acquainted with the facts, have not considered the situation worthy of editorial notice. Mayor Coatsworth has intimated that the members of the new Board of Control may be more inclined to take action.

The City Council of both Guelph and Peterboro have expressed a willingness to do everything possible to make such a show as success. Guelph offers the use of the Winter Fair Buildings free of cost, points out the advantage of having the Ontario Agricultural College at that point, and promises a hearty welcome and co-operation on the part of the city.

At Peterboro, the members of the finance committee of the 1906 council, to whom the matter was referred by the city council, have intimated that the city will be willing to erect buildings, the equal of the Winter Fair Buildings at Guelph, provided that the show is held there annually. The committee has passed a resolution favoring the holding of the show at that point, drawing attention to the fact that Peterboro is in the center of one of the best dairy sections in Canada, and pledging the support and co-operation of all sections of the community in making the proposed show a success.

OTHER NATIONAL SHOWS.

Your committee finds that National Dairy Shows, similar to the one proposed for Canada, are held annually in New Zealand, at Palmerston, in Great Britain at London, England, and in the United States at Chicago. Numerous meetings and conventions are held in connection with these exhibitions, and they appear to be accomplishing much good for the dairy industry in the countries where they are held.

We find further that the management of the Ontario Winter Fair, which represents largely the beef interests of the Province, has received grants amounting to many thousands of dollar from the Ontario Government, and that it is in receipt of a regular annual grant. The grant to the Fair in 1906 was $7,000.

The Ontario Horticultural Exhibition, which represents the horticultural interests of the Province, receives an annual government grant of $1,200 and is accomplishing a vast amount of good.

SUMMARY.

In conclusion your committee begs to report, that it is our belief, that,

Whereas, there is a strong feeling among all classes of dairymen that the time is ripe for the holding of a large annual dairy show, that,

Whereas, extensive exhibits of dairy machinery and of dairy cattle have been promised already for such an exhibition, that,

Whereas, other countries interested in dairying hold large annual dairy shows, that tend to bring those interested in dairying into close touch with each other, that,

Whereas, the beef and horticultural interests of Ontario are being assisted financially by the Ontario Government in the holding of large annual exhibitions that are proving very successful, and,

Whereas, accommodation for a Dairy Show has been promised free of cost, by two cities; that,

The time has come when the Eastern and Western Ontario Dairymen's Asssociations should unite in the holding of such an exhibition, that an effort to that end should be made immediately, and that, if at all possible, the first exhibition should be held during the winter of 1908.

All of which is respectfully submitted.

HY. GLENDINNING.
ALEX. HUME.
H. BRONSON COWAN.

OTTAWA, January 9, 1907.

Moved by Mr. Kidd, seconded by Mr. Eager, that report be adopted. Carried.

CONSTITUTION AND BY-LAWS.

PREAMBLE.

1. This Organization shall be known as the Dairymen's Association of Eastern Ontario, and shall have for its object the furthering of the interests of the Dairy Industry in all its branches, in that part of the Province.

(*a*) By holding an Annual Convention for the consideration of questions relating thereto.

(*b*) By co-operating in every way possible with the dariymen in the various dairy sections, and by holding local dairy meetings therein.

(*c*) By collecting, arranging and disseminating useful information.

(*d*) By co-operating in promoting the educational work of the Ontario Department of Agriculture.

(*e*) And by such other means as may be approved by the Minister of Agriculture.

CONSTITUTION AND BY-LAWS.

1. The Membership thereof shall consist of annual subscribers, of one dollar each, or such other sums as shall be determined by the Board of Directors, but other persons

who have been appointed by the Board of Directors from year to year, may be placed on the list of Honorary Members without the payment of such annual fee.

2. The Annual Meeting of the Association shall be held at such time and place as may be determined by the Board of Directors, and at such Annual Meeting a Board, consisting of eighteen Directors, shall be elected by the members thereof to transact the business of such Association during the next ensuing year, or until their successors in office are appointed.

3. The Association year shall be the calendar year.

4. The Directors shall elect from among themselves an Executive Committee of seven, which shall have the right to conduct such business of the Association as the Directors may specify.

OFFICERS.

5. The Officers shall consist of President, First Vice-President, Second Vice-President, Secretary and Treasurer and a Board of Audit composed of two members.

DUTIES OF OFFICERS.

6. The President shall preside at all meetings of the Association, decide all questions of Order, make such suggestions as he may deem necessary in the interests of the Association, and shall be *ex-officio* member of all Committees.

7. The Vice-President, or in his absence, the Second Vice-President, shall perform all the duties of the President in his absence.

8. The Secretary shall keep all the records of the Board of Directors, furnish certificates of membership, notify all the Directors of every regular or special meeting of the Board, keep accurate minutes of the transactions of such meetings, conduct all correspondence of the Board as a body, present at each Annual Meeting a full report of the previous year's proceedings of the Association, as well as a list of the membership and the officers elected, together with such general information on matters of special interest to dairymen as the Association may have obtained, and perform such other acts appertaining to his office as Secretary as may be required by the Board.

9. The Treasurer shall receive and account for all moneys belonging to the Association, pay all bills and accounts that have been approved of by the Association's Executive Committee, and shall, before entering upon the duties of his office, enter into bonds with security, which shall be approved of by the Board of Directors.

10. The Board of Audit shall consist of two members, one of which shall be elected by the vote of the membership at the Annual Meeting and the other shall be appointed by the Board of Directors.

Their duties shall consist of auditing the accounts of the Treasurer and presenting a report to the Association and a duplicate of the same to the Minister of Agriculture.

11. The local dairy meetings shall be held at such times and places as a Committee, composed of the President, Secretary, Chief Instructor and the Director of Dairying, shall determine.

The Director or Directors living nearest to the place where such meetings are to be held shall provide a place for the holding of such meetings and shall look after such preliminaries.

12. The Officers of the Association shall be elected at the first meeting held by the Board of Directors, except as hereinbefore provided for.

13. The foregoing by-laws shall come into effect on the eleventh day of January, A.D. 1907, or as soon thereafter as the same shall be approved by the Honourable the Minister of Agriculture of Ontario.

MR. J. R. DARGAVEL: The directors on their part have adopted this Constitution, after carefully going over each clause, and I must say we are indebted for its preparation to our Secretary, Mr. Murphy. He has spent a good deal of his time and his talents in preparing this Constitution, and I hope it will meet with your approval. I beg leave to move its adoption.

The motion was then put and carried.

CREAMERY BUTTER-MAKING.

By J. W. Mitchell, B.A., Supt. Eastern Dairy School, Kingston.

In my remarks upon creamery butter-making I purpose dealing with some of the defective features of our work—some of our sins of commission and omission—and in doing so I feel that I can truthfully claim to be a sympathetic critic.

For us to rest self-satisfied with our cream-gathering creamery system in its present state would be the height of folly. Our butter is not all that it should be, and it is better by far that we note the defects, point out their causes and seek to remedy them.

During the past season I had the privilege of visiting most of the creameries in Eastern Ontario, witnessing the condition in which much of the cream arrived at the creameries, and examining the butter made from the same. Furthermore, a large percentage of the creameries of the Province entered the scoring contest inaugurated this last year, whereby samples of butter were shipped monthly throughout the season to Guelph to be there scored by experts, and I had the opportunity of examining a number of these samples. Not only were they scored when fresh, but they were held for a fair length of time to be subsequently scored and judged for keeping qualities. In addition, we had samples of butter shipped to Montreal from several Eastern Ontario creameries, and there held in cold storage for a reasonable length of time—4 to 6 weeks—after which I examined them in company with an expert from one of the largest export houses of that city. After this and several previous years' experience in connection with the cream-gathering creamery system, I feel that the following facts should be stated, and stated as plainly as possible:

1. While much choice butter is made in our creameries, too much of the cream arrives not in a fit condition for making a prime quality of butter; its flavor is wrong.

2. Too much of the butter manufactured is inferior in quality when first made; its flavor can be no better than the cream from which it is made.

3. Generally speaking, our butter lacks in keeping quality; even if fair in flavor when first made it rapidly deteriorates, and this is a *bad fault* in butter for export purposes.

How are we to overcome these defects?

First, we need *better cream*, and I realize that the obtaining of it is a herculean task. But we must persist in educating and training our patrons to provide better facilities for taking better care of their cream. In many cases the trouble starts at milking time. The milking is done in a dirty yard or stable, or the cows are not properly brushed before beginning to milk, and as a result the milk becomes contaminated from an impure atmosphere or through particles of dirt falling into it. This is similar to allowing weed seeds to be scattered over a clean fallow. The milk in the cow's udder is clean, but if due care is not taken at the time of milking and subsequently impure air and particles of dust gain access to the milk, and carry with them undesirable forms of plant life—weeds, if you will, for this is what they really are—which in their subsequent development produce bad flavors in the milk, cream and butter, just as foul seed will produce a foul crop, or bad yeast produce bad bread. Remember that milk is an ideal seed bed for almost all forms of germ life—these organisms are minute plants. Again, the separator may be in an undesirable place, or it may be imperfectly cleaned, and be a source of trouble, or the cream may be kept in unsuitable surroundings.

The first thing to do, then, is to keep the milk and cream as free of these bad-flavor seeds as possible by the exercise of *intelligent* and *eternal vigilance.*

The next step is to make provision for *rapidly cooling the cream and holding it a low temperature*—say 50 degrees—until sent to the creamery, thus checking the growth of the organisms that do gain access to it. This is *the crying need* in connection with our cream-gathering creamery system today. As proof of this let me cite the fact that the butter that won first place in the last season's scoring contest at Guelph was made from cream that had been properly cooled and cared for at the farm. *It becomes absolutely imperative for our creamery patrons* to *store ice for cooling their cream.* A great many farmers made the fatal mistake of discontinuing the storing of ice when they purchased hand separators, thinking that the separator would, in some mysterious way, do away with the necessity for storing ice. I have little hope of obtaining a really first class quality of cream for our creameries until the practice of storing ice becomes general.

Make a fairly rich cream, say cream testing 30 to 35 per cent., and you will have more skim-milk, a better keeping cream, less cream to cool, less to haul, and a cream that will give your butter-maker better satisfaction.

Many of our creameries need better facilities for *gathering the cream.* The tanks or cans should be well insulated and well covered. Cover the cans with a good canvas cover. In many instances the haul is entirely too great; that is, the cream is kept altogether too long on the road in summer weather. Where a large territory has to be covered it would be altogether better for one collector to collect the cream farthest away and meet another at a suitable point, than to have the one driver remain on the road all day to cover the whole territory. The cream should be collected as frequently as possible—not less than three times a week in summer. If properly cared for at the farm, collected reasonably often, not kept on the road too long and properly protected in transit, it will arrive at the creamery both clean in flavor and reasonably sweet, and *no other quality of cream will produce really choice butter.*

Many of our creameries are lacking in facilities for properly caring for the cream upon its arrival. *We should like to see all of our creameries provided with coolers,* so that the cream could be cooled to churning temperature promptly after its arrival at the creamery. The creamery whose butter won second place at the scoring contest at Guelph was provided with a cream cooler and every facility for properly cooling the cream upon its arrival at the creamery. I am becoming more and more convinced that every creamery should be equipped with both a pasteurizer and a cooler, and that all cream, especially winter cream and cream the butter from which is to be held or exported, should be pasteurized and passed over a cooler.

If we could but get the cream properly cared for at the farm, and collected reasonably often and under proper conditions, and were to follow this up by pasteurization and prompt cooling of the cream, we would hear no more about the "cream-gathered cream" flavor, and our butter would become Danish butter in quality.

In conclusion I would urge upon the creamery patrons and managers throughout the Province the importance of attention to the following:—

1. Providing facilities at the farm for promptly cooling the cream and holding it at a low temperature.
2. Collecting the cream reasonably often in well insulated, well covered cans or tanks.
3. Avoiding having the cream on the road too long in warm weather.

4. The use of a cooler at the creamery to promptly cool the cream upon its arrival.

5. Pasteurization of the cream—especially in winter and when the butter is to be exported.

We would call special attention to 1, 3 and 4 as we are in crying need of reform along the lines that these suggest.

Mr. Macpherson: There is no doubt there has been great progress made in the cool curing of cheese and cool transportation on the railways and steamships, and it represents the importance of cold storage. I believe that cold storage should continue on to the farmers, and that every farmer should have an ice house for the preservation of his milk preparatory to delivering to the cheese factory or creamery. I believe this Association will approve of the resolution which I am about to present advising every dairyman to provide ice in the winter for summer use. I believe it would be a great advance to make the circle of cold storage complete, and we would have our products kept in cold storage from time the milk left the farmer until the cheese reached the consumer. I think it would be to your profit to pass a strong resolution recommending that all dairymen in this country should provide means for cooling their milk, and, on that basis, I beg leave to move a resolution which I feel sure will be backed up by the approval of this Association. The resolution is to the effect that every dairyman in this country be strongly recommended to provide an ice-house in a suitable position for the purpose of getting the milk cooled in the summer months.

Mr. Glendenning: I have very great pleasure in seconding that resolution. Just before I left home I was told that Mr. Davidson had come out ahead in the scoring contest for the manufacture of creamery butter in the Province of Ontario. I think he should be a pretty good authority when he has taken such a high standing as that. If every man put in ice and cooled his cream properly a much better article could be produced than is done at the present time, and we could produce an article that could command a higher price in the market.

The motion was carried.

Mr. Derbyshire: Another resolution I would like to move is a vote of thanks to those who have addressed us at this Convention; and that the Secretary mail a copy of this resolution to every person who has addressed us, starting out with the Hon. Sydney Fisher, and to every other man who has spoken at this Convention.

The motion was seconded by Mr. Glendinning and carried.

The Convention then adjourned.

Dairymen's Association of Western Ontario.

ANNUAL MEETING.

The fortieth annual convention of the Dairymen's Association of Western Ontario was held in the Auditorium of the Y.M.C.A. in the city of London on January 16th, 17th, and 18th, 1907. The President, THOMAS BALLANTYNE, Jr., occupied the chair at the opening meeting.

There was a very large attendance at the opening meeting, showing that a deeper interest in being taken in the dairying business in Western Ontario. As usual, in connection with the Western Dairymen's Association, a dairy exhibition was held, and for this purpose the commodious City Hall was used. There was a splendid exhibition of dairy products and it was well patronized by the citizens of London.

PRESIDENT'S ADDRESS.

BY THOS. BALLANTYNE, JR., STRATFORD.

It gives me great pleasure to be with you at this, the fortieth annual convention of the Western Dairymen's Association, and it is with a good deal of satisfaction to myself that I take this, the first opportunity I have had, of thanking you for electing me as your President a year ago. On that occasion I was unable to be present, and when I learnt that in my absence you had honored me with the highest office at your disposal, whilst feeling that I had not merited the selection, I nevertheless determined to abide by your expressed wish and to take up the presidential duties to the best of my ability.

The dairy industry of Canada takes rank with, if it does not even surpass in importance, any other industry in the country; and the prosperity of those engaged in agriculture is the surest evidence of the general well-being. This Association has always had the welfare of the Dairymen as its chief object of existence, and its members can look back over the past with a good deal of satisfaction. It is true we have not yet reached the goal of perfection, but every year witnesses improvement, and in my opinion nothing helps the good work forward so much as these annual gatherings. Here we can compare notes of our past efforts, and catch fresh enthusiasm from the personal touch which comes of meeting men who have, in some cases, met and conquered difficulties like our own.

It is here we can listen to men of authority in the dairy business, men who have achieved distinction, and who gladly and cheerfully contribute to the benefits that are to be gained by coming here and giving us of their best. It is therefore with every confidence that I ask you to do your part in making our Convention the success it will be, by a constant attendance on the meetings, and eagerness in asking questions of importance during the period given over to discussion.

Looking back over the past year, we find that Canadian cheese not only maintains its supremacy amongst provisions imported into Great Britain, but continues to grow in prestige from year to year. One of the best of British authorities reports that, on the whole, the quality of Canadian cheese was in 1906 an improvement on former years. Our cheese-makers are becoming more proficient year by year, and it may safely be said that the weakest point in the dairy industry to-day is on the farm.

However proficient our makers may become, this Association cannot rest until it has induced the farmers as a whole to take the utmost care of their milk. It behooves every cheese maker to do all that in him lies to enforce this aspect of the dairy industry, and with unresting vigilance to insist on the very best raw material. One of the most frequent causes of trouble is the boxes, and in this we seem to make very little improvement. The only hope lies in securing a stronger package, and our cheesemakers can use a powerful influence for good along this line if they will only take up the matter earnestly.

During the past season, the price of cheese has been consistently strong, though there were reactions from time to time, and in spite of the fact that exports were in excess of those of the previous season, a high level was maintained throughout. Various causes are given to account for the exceptionally high prices, amongst others being the revelations touching Chicago tinned meats, a short make in England, and a dry summer on both sides the Atlantic. Whatever the real cause or causes were, it would seem unwise to count on a similar state of affairs during the coming season, although I am satisfied that if our quality is maintained, a very good average in price may be reached.

Turning to the export movement in butter, I find that the results have not been so satisfactory. Indeed the season has been the poorest for several years. The total exports from the port of Montreal show a falling off for the past season of no less than 212,000 packages, representing a shrinkage to the value of $2,600,000. This may be accounted for in some measure by the high prices paid for cheese, making it more profitable to send milk to the cheese factory instead of the creamery. Then our home consumption has played a large part in the market. With the growth of population, and the prosperous times, the demand has been on a larger scale than formerly, all of which has tended to keep up the price of butter.

One of the greatest needs in the butter industry is the maintenance of efficient cold storage at the creameries. It has been clearly established that the lower the temperature, the greater the degree of preservation, and there is nothing else known that has so marked an influence as that of temperature.

The London *Times*, a newspaper whose market reports are exhaustive and discriminating, discussing the characteristics of imported butters, declares that if means were used in Canada to raise the average quality of Canadian butter, it would command high prices.

This means that our butter makers will have to put forth every effort to make and maintain a high standard, or we shall never capture the English market. The example of our cheese industry should act as a stimulus to the weaker half of the dairy industry.

The directors of this Association agreed to assist the Department of Agriculture in carrying on a butter scoring contest during the past season, giving $70 towards prizes. Creamerymen have taken a lot of interest in this contest, and we believe it will help to create more enthusiasm among butter makers generally. We also decided to have our creamery instructors do some experimental butter-making under creamery conditions. Mr. McDougall spent three weeks at the Glencoe creamery, and the butter made there has been kept in cold storage, and is on exhibition at the city hall for makers to examine.

A winter dairy exhibition is again a feature of our annual Convention, and I am glad to report a larger number of entries than ever before. I consider the display a credit to the dairy industry of Western Ontario.

During the past season the Association has employed the same number of instructors as in the previous year, and the work so successfully carried on then has been extended and improved. The Chief Instructor will give a full report on all these matters at a later session.

During the year a committee of this Association met the Minister of Agriculture for Canada, along with the Dairy Commissioner, in order to discuss the question of securing properly graduated and marked glassware for use in factories and creameries, and progress along this line is hoped for.

I am sure that I voice the opinion of the directors of this Association in uttering a word of appreciation, and saying how very highly we value the assistance and liberality of the Department of Agriculture for Ontario, in carrying on the work of the Association, and this not only in instruction, but in their appointments of two Sanitary Inspectors. I believe this to be a step in the right direction and feel hopeful that in the coming season the Department will see fit to make all the Instructors, Sanitary Inspectors as well.

In conclusion, let me again urge upon you the value and importance of our annual gathering of this nature, where each one of us may, if we meet here in the right spirit, receive valuable benefits which can come to us in no other way, and from which I hope an enthusiasm may be kindled which shall serve to support us through the coming months of effort.

Mr. Barr: You will see that our expenses have increased on account of our winter exhibition and also on account of the scoring contest. The Western Dairymen's Association took charge of all the butter, selling this butter and paying the makers for it, so that the money passed through our hands during the season. I was going to say I am sorry. I am not sorry; but in that passing through we lost in the neighborhood of $80, though I believe that money fairly well spent. We were not able to get as much for the butter as we paid for it; paying for it at the price, in nearly every case, sent in by the butter-makers, so the reason we have such a large expenditure and such a large amount of receipts is on account of the Dairy Exhibition and our butter scoring contest for the last season.

THE USE OF THE MILKING MACHINE FROM A BACTERIOLOGICAL STANDPOINT.

By S. F. Edwards, Bacteriologist, O.A.C., Guelph.

Our investigation with the Burrell-Lawrence-Kennedy milker was of brief duration. The object was only to determine whether pure milk could be obtained with the machine milker under conditions that would make its use practicable upon the farm.

No attempt was made to determine the species of bacteria present in the samples beyond the detection of acid producers and those which liquefy gelatin. Milk procured under even more cleanly conditions than usual, either by machine or hand milking, will contain a varying number of species of bacteria. Of these, the acid-producing organisms are largely lactic acid bacteria which only sour the milk and are harmless. Organisms which can liquefy gelatin can cause a chemical disintegration of the nitrogenous constituents of the milk, visible to the eye in old milk, as a liquefaction of the curd. During this process products may be formed which are poisonous to the body, causing gastro-intestinal disturbances. Aside from the acid, producers and liquefiers, other species may be present, some inert, while some alone or in associative action with others are apt to produce objectionable odors or flavors in milk, or its products butter and cheese. Disease-producing organisms may be present if the animal is diseased.

As bacteria are always associated with dirt and filth, the bacterial flora of milk, either machine or hand drawn will depend upon the cleanliness of the surroundings where the milk is secured. In this connection it may be said that the conditions existing in the College dairy barn are far better than those which prevail upon most farms.

The Cleanliness of the Milking Machine. From the time the milker was installed until after the test began, a period of about seven months, the machine was cleaned according to the directions issued by the manufacturers. The first samples were taken as the milker was ordinarily operated, the cows being milked by machine and by hand on alternate days.

Of the machine-drawn samples in this first series the highest number of bacteria in any one was 1,208,000 per c.cm. (about 20 drops); the lowest was 203,000 per c.cm., with an average of 500,328 per c.cm. Of the hand-drawn samples in the same series, the highest number was 68,900 per c.cm.; the lowest was 3,200 per c.cm., with an average of 23,583 per c.cm. The relative proportion of acid producers and liquefiers to the total number was approximately the same in the hand-drawn and machine-drawn samples. Every simple of machine-drawn milk showed a very high bacterial content, while all but one of the hand-drawn samples showed a bacterial content comparatively low. In the production of ''sanitary'' or ''certified'' milk in cities, the standard established by different health authorities varies from 10,000 to 50,000 bacteria per c.cm. In every case but one the hand-drawn milk was as pure as ''certified'' milk, while in all the machine-drawn samples the limit was far exceeded.

A series of samples was next secured with the aim of determining the effect of boiling the rubber parts and cover of the milker once a week. The average number of bacteria per c.cm. in the samples taken on days when the parts of the machine were subjected to the boiling temperature for 2 or 3 minutes was 37,962, two of the samples being below 16,000. On the other hand, samples taken when six days had elapsed after boiling the parts, ordinary cleaning being practised meanwhile, showed a bacterial content of nearly 150,000 per c.cm. The results of these tests showed that with extra precautions machine-drawn milk could be secured which compared very favorably with hand-drawn milk, stable conditions being the same. They also showed the futility of attempting to produce pure milk by relying upon a sanitary cleaning of the machine only once a week.

An expert representing the manufacturers prepared the milker for the next samples, spending considerable time and care in getting every part of the machine thoroughly washed, boiled, and steamed. Only two samples were taken, and only the total number of bacteria present was determined. One sample showed 1,407 bacteria per c.cm., the other, 1,776 bacteria per c.cm. These results show that it is possible to secure milk having a very low bacterial content with the machine milker, but the time and care required to prepare the milker for producing such milk would make it impracticable for any but the large dairy farmer.

Wholesome milk can be secured and bacteria largely excluded by observing a few precautions to prevent bacterial contaminations. The source of these contaminations may be stated briefly as follows:

The Stable. Manure teems with different kinds of micro-organisms, and if allowed to accumulate in the stable a part of it becomes dried, the bacteria contained are thrown into the air by movements of the animals and caretakers, and many of them settle into the pails during milking. Straw and other litter used for bedding contribute a large number of bacteria to the air when stirred, as also does feed of any kind which makes dust in the stable. Bedding and feeding, therefore, should be done at least an hour before milking, or after milking. In short, the stable should be as free from dust as possible during milking, either by hand or machine.

The Animal. As hairs and particles of dirt from the animals carry many bacteria, the cows should be kept groomed, and the flanks and udder should be wiped with a damp cloth just before milking. This will keep much filth out of the pails. A few drops of milk remain in the teats after milking and the bacteria present or gaining access from around the opening of the teat may multiply here to many hundreds from one milking to another. If in milking the first few strippings are rejected these bacteria will be eliminated.

The Milker. The milker should wear clean clothes, have clean hands, and should be a healthy individual. Many cases of typhoid fever and diphtheria have resulted from drinking milk handled by convalescents from these two diseases.

Utensils. All utensils should be first rinsed thoroughly in cool water, washed in hot water containing a little sal-soda, thoroughly scalded or boiled, and kept inverted until ready for use to prevent bacteria falling into them from the air.

All these precautions are equally important in producing pure milk, whether machine or hand milking is practised, and only by their observance can the farmer or dairyman produce pure milk. It remains, then, for each individual, who alone is the best judge of his own conditions, to determine whether he would be warranted in making the outlay of money necessary for the instalment of a machine milker.

Our work may be summarized briefly as follows:

1. It is possible and practicable for the general farmer as well as the dairy farmer to produce pure milk, either by hand or machine milking.

2. To produce pure milk by hand or machine milking, scrupulous cleanliness must be maintained about the stable and animals, the person of the milker and utensils.

3. Strict sanitary precautions being observed, hand drawn and machine drawn milk in our test showed approximately the same average bacterial content.

4. The mere fact that milk is drawn by the Burrell-Lawrence-Kennedy milker is by no means a guarantee of its purity. It may contain many more bacteria than hand-drawn milk under similar conditions.

5. We would not advise the installation of a machine milker, unless the farmer or dairyman is prepared to fulfil the sanitary conditions essential to the production of pure milk.

REPORT ON DAIRY HERD COMPETITION.

Mr. G. H. Barr read the following report:

The directors decided during the summer to offer two medals for a dairy herd competition.

The regulations governing this competition was that no herd of less than eight cows would be allowed to enter, and the prizes be awarded to the patron receiving the largest amount of money per cow from any cheese factory or creamery in Western Ontario from April 1st to October 31st, 1906. Figures to be taken from the factory or creamery books, and certified as correct by the secretary and maker.

Fourteen patrons of cheese factories and one patron of a creamery entered the competition. Two of these failed to send in statements. The following is a tabulated statement of the herds:—

Name.	Acres in farm.	Breed of cows.	No. of cows.	Total milk.	Average per cow.	Total money.	Average per cow.
				lbs.	lbs.	$	$
M. L. Haley, Springford.....	90	Holstein..............	11	71,701	6,512	687 49	62 50
M. H. Haley, Springford.....	100	Holstein grades.......	12	80,259	6,688	733 71	61 14
Jacob Swance, Norwich......	125	Holstein grades.......	12	79,920	6,660	730 80	60 90
W. E. Thomson, Woodstock .	100	Holstein grades.......	12	80,294	6,691	725 82	60 48
W. E. Mason, Tyrell........	280	Holstein grades.......	20	134,617	6,730	1,178 34	58 92
Martin Swance, Springford..	125	4 grade Shorthorn, 9 grade Holstein......	13	82,639	6,256	761 75	58 60
Wm. Bell, Avonton.........	100	Holstein grades.......	9	52,979	5,886	512 37	56 93
Chas. Baird, Motherwell	180	Holstein and Holstein grades..............	16	98,839	6,177	908 79	56 79
Reuben Gleason, Medina	150	Holstein grades.......	24	134,818	5,617	1,302 91	54 25
R. M. Cowing, Listowel,.....	100	6 grade Holstein, 10 grade Shorthorn	16	85,261	5,328	817 37	51 08
(Started sending April 9th).							
W. H. Mead, Lakeside	50	Holstein grades.......	8	37,125	4,640	367 24	45 90
Chas. McCann, Glendale	133	Shorthorn grades......	9	38,045	4,227	365 49	40 61
Creamery Patron.							
Robt Bowie, Beachville	50	Not given............	8	47,464	5,933	448 60	56 07

You will notice that it was not the patron who received the most milk per cow that won the prize, and this is due to the fact that the charges for making are greater in some factories than in others.

If another competition was entered into I believe the prize should be for the most pounds of milk per cow instead of for the most money, as the prices for making and drawing the milk vary so much in different factories and creameries.

I believe the Dairymen's Association would be doing a wise thing to offer a handsome prize for a dairy competition in 1907.

Since awarding the prizes we have received a statement from Mr. Wm. Cornish, Putnam, as follows:—10 cows, total milk 65,524 lbs., average pounds per cow 6,552 lbs. Total money $631.59. Average per cow $63.15.

The Chairman: You have heard Mr. Barr's report on the dairy herd competition, and the best of it is that we have Mr. Haley here with us, who will be able to give us some idea of how he feeds his cows, and any other information necessary.

Mr. **Haley**: I am sure I appreciate very much that I am the winner of this prize. I did not know last season that I would be called on this platform this afternoon on an occasion of this kind. I not only feel it an honor, but I appreciate it very much, and it is gratifying for me to know that I have accomplished so much in the breeding and feeding of my cattle. I believe I owe a great deal of my success to the teachings of this convention, to the Dairy Institute meetings, and to reading farmers' journals, for all these have pointed out to us the different methods and how to follow them. It is only a few years ago that I started to improve my stock by using pure-bred sires and weeding out the ones that were not profitable, and by keeping records of each cow. I had the figures down here of eleven cows. Mr. Barr has given you the figures, and I do not think it is necessary for me to go over them again. In order to be successful you should breed only first-class pure-bred sires. Feed them liberally so as to develop them. In order to feed or breed for milk you must have animals for that purpose. I believe also in regularity in milking and feeding. I have always been particular about milking at a certain time, morning and evening. I might say all the feed I have fed my cattle has been produced on my farm. I leave the cows dry six weeks to two months, and when they are dry it is an important thing to feed liberally food of a succulent nature to build them up in health, for I believe during that period you are to a great extent fixing the future usefulness of the offspring. Then they are good and strong, and you have a good strong cow after she freshens. I have noticed in some cases when the cow is in poor health that when she freshens the calf has some trouble.

I was asked since coming into this building where I was from, and I might say it is a pride for me to answer that I come from Oxford county. It is a great dairy county. If you want to go into the dairy business you cannot do better than take a trip down in the county of Oxford. We have some of the finest dairy cattle that there is in the Province. I thank you very much for this medal, and I appreciate it very much. I do not think the Association could do anything better to further the dairy interests than the awarding of a prize of this kind from year to year. In our section, and I suppose it is the same in other sections, we had quite a strife to see who could send the most milk to the factory, and I am sure if something of this kind was presented every year we would have some remarkable records.

Q.—How many cows does Mr. Haley keep?

Mr. **Haley**: Eleven.

Q.—How do you feed them?

A.—Ensilage and meal. Just as soon as the pasture begins to dry up I feed them ensilage and roots in the stable, and meal.

Q.—Had you any heifers among that herd?

A.—Two two year old heifers; but they were extra good ones.

Q.—What kind of grain do you feed?

A.—Oats and peas mixed. I believe it is a great thing to keep cows up in flesh when they are dry. I think that is where a great many people make a mistake. When the cows come in in the fall they are in comparatively good flesh, and when they dry some people just let the cows shift for themselves, and then they start to go down. I make a practice of keeping them well up in flesh all the time.

Q.—Do you feed grain all summer?

A.—Yes, I feed some as soon as the pasture begins to fail. Probably you noticed my brother sent more pounds of milk than I did. He had alfalfa. I do not think there is anything better than alfalfa. I had Hungarian, but I do not think it is as good as alfalfa.

Q.—Do your cows get fleshy?

A.—No; not very much. I do not think a cow can respond very much if it goes to flesh instead of milk. They respond to the feed if you feed them well.

Q.—Give us the average percentage of butter-fat in the milk?

A.—We do not test it. Our cheese-maker is here, he will know.

The Cheese-Maker: Your milk had not been tested for butter-fat at the time we quit making butter; at that time your milk was about the average at the factory.

Q.—Holstein milk is rather thin?

A.—It depends on how they are fed. We had a little strife between the men at another factory, and the Jersey man said, "If you drop a quarter into a pail of milk and you can see the quarter that is Holstein milk." (laughter); and the Holstein man said, "If you drop a quarter in a pail, and the milk does not cover the quarter, that is Jersey milk. (Laughter and applause.)

Q.—Do you think it pays to weigh the milk?

A.—It takes considerable time, but we have a little pair of scales hanging on the wall on which we can hang a pail. I think it is time well spent.

Q.—Did you find much variation in the cows?

A.—Not if they are fed regularly.

Q.—On the whole you think it is time well spent?

A.—If the person is interested in improving his stock I think it pays.

Q.—With your eleven cows can you tell the one that is giving the least milk?

A.—I think we can. One of my heifers was giving 40 to 45 pounds a day, and another man had a heifer which he said was giving 40 to 45 pounds, and I said "Did you weigh it?" and he said "No." And I have found a big difference in the 45 pounds of milk that a man weighs and the amount of milk that he does not weigh.

Q.—If you have two heifers in the same herd you know what milk they are giving?

A.—Yes, but I think it is better to weigh it because some cows throw a lot of froth; you think the pail is full, but there will be a lot of froth.

A Member: There has been a lot said about this weighing of milk; the question is whether it is going to pay for the time and trouble.

A.—I would like to have a cow-testing association in our neighborhood. I am quite anxious to improve my cattle, and I would like to know what they are doing.

REGULATING THE ERECTION OF NEW CHEESE AND BUTTER FACTORIES.

Mr. W. K. MacLeod, Vanneck: There was a meeting of the owners of factories over in Somerset Hall, and they talked over matters of special interest to themselves, and we are here to report what has been done. We recognize the fact that the Association in Western Ontario is a strong power in the interests of making more perfect arrangements which enter into the manufacturing of cheese and butter, and we want, in this case particularly, to have all the influence that we can, to have the sympathy of this Association in this matter, and to ask for your help.

There were a couple of resolutions passed by the owners of factories at the Eastern Dairymen's Association, and when read to the people who met over in Somerset Hall they thought that they expressed their opinion all right, and they ask that they be submitted to the meeting here for discussion and adoption if you thought well. That is what was done over there. There is no intention on the part of these gentlemen at all to oppose the makers or the patrons, or to put prices up, or to be exorbitant in their price, or anything of that kind. Their desire is that they will be able to bring the affairs connected with their business into sympathy with the changed conditions that are going on. All over the country in almost every line of business we see in the papers where expenses are so increased. The expense of living is increased. Wages and the expenses of raw material that enter into the manufacturing of their goods has increased so much, that it is impossible to conduct business in the same way that it was some years ago. As these conditions change people who are in any line of business must change their methods, and change so as to meet existing circumstances. Now that is all that these people wish to do, and they ask the help and sympathy of the Western Dairymen's Association in accomplishing this. I think, perhaps, without taking up any more of your time I would ask Mr. Cowan to address you. I think he will be able to explain the situation much clearer than what I would be able to do, and read to you the resolutions which were recommended to be submitted to you for adoption if it was thought advisable.

Mr. Cowan: Mr. McLeod has stated the case very clearly. In spite of the high prices that have been paid for dairy products, manufacturers and sellers have not been getting the prices to which they are justly entitled. Many of the best makers have been forced out of business. In some cases that has been due to the senseless competition of the manufacturers themselves; in other cases it has been due to opposition factories that have been started by patrons, and these factories not continuing any length of time. I believe I am safe in saying there are several hundred factories in Ontario, the owners of which did not make a living wage this year out of their factories. In addition to this many owners of factories have been ruined by the erection of competing factories in their close proximity. I could give you numerous cases. I presume almost every dairyman here knows that is the case. Take the case of a man who sixteen years ago bought a factory that was pretty nearly run down, spending all his money on it improving it. About six years ago a factory started about a mile and a half away and cut his business almost in half. He managed to keep on, and now they are starting a factory a mile and a half the other side of him. After sixteen years work his business is practically ruined, and he is going out of it. I can give you the case of a man in Oxford County, who, two years ago, paid what he thought was a reasonable price for a factory, got it going pretty well, and the old proprietor came back and told him that if he did not sell out for about the same price as he paid for it they would put up another factory right beside him. It is felt, therefore, that it is time the manufacturers should get together and discuss this matter, and two meetings were called, one in Ottawa, and one here this afternoon. The intention is, not to do anything that will be unfair to the patrons. The best evidence of that fact is that the proprietors have been willing to allow any person to attend their meeting, and they have come over here to discuss this matter with you that they may get your sympathy and support in any movement that may be made.

The speaker then read the resolution in favor of the National Dairy Show passed at the annual meeting of the Eastern Dairymen's Association and said: I might state that at the meeting at Ottawa, not only was this resolution passed, but it was felt that the best way to deal with this matter was to be perfectly frank and outspoken with the patrons of factories, and they decided that the best way to do this was simply to prepare a statement showing the reciepts and expenditures in connection with representative factories, and I wish to publish the statement to the patrons of factories, which can be read at their annual meeting and discussed and considered in any way that may seem desirable. That statement was prepared at the meeting in Ottawa to enable them to give you a clear idea of the situation this afternoon. I think it is well I should read the resolution:

"That it is the opinion of this representative meeting of proprietors and officers of cheese and butter factories situated in Eastern Ontario, that there is no one matter that is retarding the development of the dairy industry in Ontario as much as the merciless competition between factories; and the fact that the owners and officers of factories have no guarantee; after expending perhaps all the money they possess in the erection or improvement of their buildings, that their investments will not be ruined and their labors lost by the erection of a new factory or factories in their immediate vicinity. It often occurs that these new factories are erected by some ill-advised person, or through spite, and that they continue in business for only a few years and fail. During their existence, however, they do great damage to the dairy interests in their sections. We learn that the Government through its sanitary inspectors, contemplates taking action that will compel owners of factories to spend large sums of money improving their buildings to place them in a sanitary condition. While we do not want it to be thought that we desire to block anything that is in the interests of the improvement of the average quality of our dairy products, we feel that it will be unjust for the Government to compel the owners of factories, whether owned by joint stock companies or by private individuals, to incur heavy expense improving their buildings, without giving said owners some guarantee that their investments will not be ruined by the erection of a new factory in their close proximity. We, therefore, desire to petition the Ontario Legislature for legislation at its approaching session that will give the owners of existing factories the right when a new factory is established within a certain distance of their buildings, to apply for the appointment of arbitrators, who shall have the power to determine what damages, if any, shall be allowed to the owners or officers of the existing factory for the injury done their business, and that the new factory shall not be erected until such damages have been paid. We believe that this request is reasonable, and that justice demands that it shall be granted, and that if it is granted it will immediately place our dairy industry on a more stable basis and result in a great and immediate improvement in the condition of the factory buildings throughout the Province."

I feel that the proprietors want something of that kind. They are aiming at a mark, and they want some sort of protection. I am inclined to think that the proprietors would be quite satisfied if the Government would appoint a committee to look into any new factories, and say if it is in the interests of the whole section that a new factory should be established. That was the resolution unanimously passed at Ottawa, and later approved by the Eastern Dairymen's Association, and they have appointed a deputation to wait upon the Government to urge for some legislation along these lines. That is the first matter to be considered and which you will be asked to discuss here this afternoon.

The second matter is in regard to the cost of manufacturing They prepared the statement showing that the factories were not making any profit. They want this statement to be sent broadcast. The more publicity it is given the better pleased they will be.

At the meeting this afternoon the first resolution with regard to arbitration has been moved and seconded. It is desired that they are to be discussed here this afternoon, and that later the discussion should take place with regard to this matter of the cost of manufacture. (Applause.)

Moved by Mr. W. W. SMITH, seconded by Mr. A. J. HERRICK, that this resolution as read by Mr. Cowan be adopted by this Association.

A MEMBER: I am surprised and disappointed at the proceedings taken this afternoon. I would much rather you would continue the meeting as advertised. This may be of much greater importance, but it seems to me like a little combine among the cheese-makers, and I think we should discuss the milk production, and I would much rather you would continue the programme as advertised.

The CHAIRMAN: This subject we are discussing now is of just as much interest to the farmers as the cheese-makers. (Applause). I think it is in their interests as much as anybody else.

The MEMBER: It may be all right, but I think it is a little out of place.

The CHAIRMAN: I do not think it is.

The MEMBER: In my case I took the train in to hear the subject of milk production, and it does not interest me as much as the subject billed for.

Another MEMBER: Hasn't a man got a right to start a cheese factory where he likes. This is a free country. Can't I start a factory wherever I like?

Mr. COWAN: I might say there has been a misunderstanding. The cheese-makers were to have met by themselves and discuss their own business, and then come to this Association and ask for co-operation. It was rumored around, however, that there was a misunderstanding, that the meeting over there was a reflection on the meeting here, and the Dairymen's Association decided to extend an invitation to the manufacturers to come over here and discuss this matter. As regards that matter of arbitration, the manufacturers are unanimous that where the patrons of factories think they are being charged too high a price, they are quite willing to give the patrons the right to expropriate that factory.

Mr. McLEOD: This business is in the interest of the farmers just as much as it is in the interest of the owners of factories. Because if the owners of factories have their business on a basis that it is going to make it a paying business for them, then they are going to look after the manufacturing of the product in a better way, and eventually it means better prices. So that in the long run it comes back to the patrons, and it is a matter that we patrons and manufacturers and makers should look into. It is a partnership business all around, and what benefits one benefits the other, and that is the reason the matter has been brought up in this way. We hope that any farmers here will express their opinion on this, and if they are expressed promptly the matter will soon be disposed of. It will only take a few minutes, and after this the other matters on the programme can go on, and those men who came here especially to hear this will get the information they are after.

A MEMBER: This matter has been sprung on this meeting, and I do not believe this meeting is ready to discuss that subject, it would give the manufacturers and everybody in connection with it a better chance to speak and a better understanding of the subject if it was put off to another meeting. Nearly everyone here is interested in the subjects that were to be taken up, and I do not think the meeting is just in the temper to discuss that matter now. I believe it would be better handled at another meeting, say this evening. Would it be in order that this be postponed to another session?

Mr. McLEOD: I think the suggestion is a good one, and if anybody thinks this matter has been sprung on the meeting, I think I voice the opinion of the makers who were at the other meeting in saying that now the resolutions are read and the matter presented, you should have a little time to think it over.

DAIRY RECORDS.

Mr. C. F. **Whitley**, of the Dairy Commissioner's staff, Ottawa, then read a paper on "Dairy Records," which already appears in the report of the proceedings of the Eastern Association, page 10.

Mr. **Freeman**: Have you any way of numbering a herd so that a man can keep a record?

Mr. **Whitley**: The majority of our men have both names and numbers. Some of them use ear tags. If you have a number of cows they will come in and take their places regularly in the stable.

Mr. **Freeman**: They do not do that in our neighborhood.

A **Member**: I have 25 in my stable, and they take their places every time, and you cannot get them to take any other place.

Mr. **Freeman**: We have no stalls in our neighborhood.

Prof. Dean: In our own herds we use ear tags. We have about 30 cows, and I ordered 100 tags, and each one is numbered.

A **Member**: Where do you get those tags?

Prof. Dean: They are advertised in nearly all the agricultural papers in the United States—the Dana Ear Tag. It is not my intention to take any part in the discussion, but I would like to emphasize this work which Mr. Whitley is doing. It is on the foundation of successful and profitable dairy work. No man to-day can afford to keep 10, 14 or 20 cows without knowing what each and everyone of these cows is doing, and the only way to find that out is to get a pair of scales and test and weigh the milk at regular periods once in a week or once in ten days and find out which are the profitable cows, and get at the basis of successful and profitable dairying. It does not take very much labor. We have followed that plan for sixteen years in our own herd, and it is the only way you can possibly build up a dairy herd. I think every man should use a pure-bred dairy sire. That is the first thing that the dairy farmers of this country have to do. They have been using grade sires and sires from beef breeds, and the result is that the average production from the cows of Ontario and Quebec is only 3,000 pounds of milk. And why? Because they have been using any kind of sire, and in many cases using just an ordinary scrub sire from beefy breeds; and that is the first fundamental mistake which our farmers have been making.

I have no special breed that I would care to name; but I would like to emphasize the importance of having a pure-bred sire of a good dairy breed. The second point I would like to emphasize is to feed these cows well; not only when they are milking, but after they are dry. The farmers are making a great mistake by not feeding their cows better during the winter. Some men will actually give a cow all the straw she will eat. (Laughter and applause.) The time to build up the system of the dairy cow is when she is dry; for the amount of milk which a cow will give the next summer does not depend on the amount of feed they are given in the summer, but how they are fed in the winter. Many men are keeping them through the winter any old way,and then they expect them to give good results. I consider it is necessary to feed a cow well while she is carrying her calf, in order that that calf should be a good milker. Some men just keep the cows living during that period, and that is the reason a great many of our heifers never make good milkers. The quality of the dairy cow depends first on the sire, next upon the dam, and then on how these calves are cared for and nourished while they are being carried by the dam. The constitution of every animal, man included, depends on the vitality which they receive at that time. If the calf is not well nourished in the dam it will never be a strong vigorous calf. I would like these three points born in mind with regard to improving the dairy herds of this country. First, use pure-bred sires; second, feed the cows well, not only when they are milking, but when they are dry.

A Member: Who supplies the blank forms for keeping records?

Mr. Whitley: The Dairy Commissioner's office will be pleased to send you all the forms you want. I shall be very glad to-day or to-morrow to get the name of any man who thinks there is room in his locality for an association. We are prepared to organize twenty or thirty more associations this year, and if you will let me know or drop a line to the Dairy Commissioner at Ottawa we will be glad to assist you.

A Member: Do we get all the supplies necessary?

Mr. Whitley: The Department supplied blank forms, and the preservatives, and does the testing free. The bottles and scales can be procured from any dairy dealer in the Province.

Mr. Paget: In conversation with Mr. Ruddick some few weeks ago, he said that, where an association wanted to be organized, he would not only send a man to assist in the organization of the association, but that they could get these supplies necessary for the work of that association through the Department, so that they could depend on the reliability of them.

Mr. Gleason: In view of Prof. Dean's remarks as to the way we should raise our dairy herds, I would like to say that he has made three very important points. I think if our farmers would raise their herds in that way, and feed in the way he says, there would not be much necessity for keeping records. If we would raise our heifers along that line, and feed them generously, then I think the great majority of our cows will be good producers. By weighing only once in ten days you are apt to be wrong, because at the time you take the test the cow might be doing better or worse than usual.

Mr. Whitley: I am glad this point was raised, for the reason that while the Department is advocating this way of testing, it does so in the hope of getting a great many farmers to take up the work so that you will be able to weigh every day. It is infinitely preferable to weigh every day, because you get at once at any variation, and you seek for the cause and remove it.

Mr. Freeman: There is one thing I do not feel quite satisfied about. We have heard from the Dairy Commissioner that the average cow only gives 3,000 pounds, but I see they include the Province of Quebec. I do not like that. I would like to know what is the average for the Province of Ontario. I think our average would be higher.

A Member: I would like to ask what is the breed a man should raise to get the best possible output of milk. I think Prof. Dean said it did not make any difference so long as a pure-bred sire was used. I am in favor of the Holstein. I have a son who wants to go down to the Agricultural College and he will possibly be under Prof. Dean. I am teaching him that the Holstein is the best possible cow be can buy, and if Prof. Dean says it does not make much difference what kind he gets as long as they are pure-bred that will make quite a difference. I want to know what is the best possible class of cow to bring the best results from a financial standpoint. I think it is the Holstein, but if Prof. Dean says some other cow, then I want to adopt that cow.

Prof. DEAN: That is the greatest tribute that has ever been paid to me in sixteen years—the fact that a man would be willing to take my judgment on this question of breeds. If I gave the impression that any pure-bred sire would do, I want to remove it. I think I said the main point was to use a pure-bred sire of a dairy breed. Now there are several of the dairy breeds, and when we get on to that question we get on very dangerous ground. In sixteen years we have had five different breeds of cattle under careful testing. We have found the greatest number of profitable cows among the Holsteins. I suppose some Ayrshire and Jersey men will climb on to me for making this statement. What is the reason that there has been undoubtedly a larger number of profitable cows among the Holstein? It is found in the fact that twenty-five years ago the Holstein breeders took up this question of testing their cows, and adopted advanced registry; the other breeders have been paying too much attention to fancy points, breeding for color, and clean-cut muzzles, and fine horns, and slim tails. Do we keep cows to grow slim tails or fine horns? No. We keep them to produce milk. That is the main thing we want with reference to cows, and unless the breeders of every dairy breed of cattle wake up, and they are waking up to the importance of testing their cows, they will find it very difficult to sell their stock.

I was talking recently to two men in Ottawa who are interested in dairy cattle. I was told that one of them had said, when he got hold of Prof. Dean he would give him a good "lambasting." We talked over this matter, and after we got through they acknowledged that this agitation in favor of testing cows had done their breed a great deal of good. Farmers of this country are prepared to pay long prices for bulls from cows that have good records. We have a cow that I consider is the best cow in Canada to-day. She gave us in thirty days, in the month of November, 2,522 pounds of milk, testing 3.5 per cent. of fat. She gave us in seven days 643 pounds of milk, and in one day 96 pounds. In the months of November and December, 61 days, she gave nearly 5,000 pounds of milk. I do not know of how many men have spoken to me for the calf of that cow this year already, and one of our boys, just as soon as the calf was dropped, came to me and said, "What do you want for that calf?" I said "$50," and he said "I will take it."

A MEMBER: What breed?

Prof. DEAN: The Holstein. The farmers are not any longer willing to pay money for bare pedigrees; that day has gone by. The farmers who wish to improve their stock want to get bulls from the cows that have been tested. Like does not produce like. It is just as often that like does not produce like as it is that like produces like. But when you get a cow whose ancestors have been good milkers, then a calf from that kind of a cow will be likely to prove a good milker. It is a fact that only about one out of five of the average heifers raised prove first-class milkers because they have not got dairy blood at the back of them, and you must go back many generations before you can be sure. Only 50 per cent. of the blood of the direct parents goes into the progeny, and the other 50 per cent. is made up of the blood of the ancestors.

A MEMBER: I am very much obliged to Prof. Dean for what he has said. I am going to put my boy under his tuition next September, and if he can teach him what he knows, either by coaching or with a club, in ten years from now I will wear a diamond. (Laughter and applause.)

ADDRESSES OF WELCOME.

Mr. J. C. **Judd**, Mayor of the city, delivered a cordial address of welcome.

Mr. **White**, President of the Board of Trade, also welcomed the association in a witty and hearty manner.

President **Ballantyne** responded in a suitable way.

NATIONAL DAIRY EXHIBITION.

Mr. **John N. Paget** presented the report of the committee appointed to confer with the committee of the Eastern Association *re* the proposed National Dairy Show. The report was similar to that appearing on page 100.

In presenting this report to you I do not wish to occupy very much further time. Perhaps there will be others who would like to speak on the subject. After giving the matter a good deal of consideration, and consulting with leading dairymen throughout many parts of the Province, there appears to be a general consensus of opinion that the work of promoting the dairy industry in this Province has, perhaps, reached its usefulness, after continuing along lines similar to what have been followed in recent years. We find that conditions in almost every line are changing with time as it passes. The conditions on the farm are very different from what they were a few years ago. The conditions that were successful in bringing the dairy industry of this Dominion to the place that it holds to-day have been successful, but the question now arises, is it wise to continue along that line, to continue methods that have accomplished their purpose? I believe a great deal of good might be done in holding such an exhibition as has been outlined in the report. I believe that, in maintaining the position that we occupy in connection with the dairy industry, we will have to reach out to the men on the farms and educate them to send better raw material to the factories. The work of this association and of the Department of Agriculture has been largely confined to instructing the men in the science of making butter and cheese, and it has accomplished its purpose. We believe there are a sufficient number of men who are competent to make the finest quality of goods, and we have received some reports from the Old Country that have been very encouraging with regard to the quality of both our cheese and butter. Unfortunately, we have had some reports that were not so encouraging, but I believe there are a sufficient number of men capable of manufacturing fine cheese and butter, if the material from which they have to make these food products is delivered to the factory in the very best condition. In order to show you the benefit that would be derived from holding such an exhibition I have only to refer to the Winter Fair in Guelph, which represents the beef industry in this country. That exhibition is gaining more support from year to year. The number of agriculturists who attend that fair is very large, and there is no comparison between the number that go to a fair of that kind and the number that attend one of our conventions. In going up and down the country I frequently hear the remark made, in connection with the dairymen's convention, that we are going over and over the same old thing, from year to year. I believe that if an exhibition such as a National Dairy Exhibition could be held at a central place, such as Toronto, it would be a great success; but in order that it should be successful it ought to be held at a central place such as Toronto. If we could bring the farmers together, and demonstrate to them work similar to that conducted in connected with the Winter Fair at Guelph, very much good would be accomplished and very much done to not only maintain but to advance the work. As Mr. Whitley said this afternoon, the work he is engaged in in connection with the cow testing of this country would receive a stimulus, and it would mean dollars in the pockets of the farmers. Mr. Whitley said that our dairy products might be increased to $30,000,000 annually. If that is the case, and I believe it is, I think the time has arrived when we had better get out of the old rut and adopt methods that will be more advanced, and will further this great industry, and I do not know of anything that would be better than the holding of a National Exhibition, such as has been outlined in this report to-night. (Applause.)

Mr. H. B. Cowan, editor of *The Canadian Dairyman*: In consideration of this question it seems to me there are two things we ought to look at. First, is such a show needed? I think every person will admit that the time has come when we will have to specialize along agricultural lines. For several years I have had the privilege of attending meetings of the directors of both Eastern and Western Dairy Associations, and I have found they have both been confronted with the same difficulty, "How to arrange their programme so as to secure a good attendance at their Convention?" They have put up one afternoon for the dairy farmer, another session for the creamerymen, another session for the cheese-makers, and they have found it difficult to make this session sufficiently interesting to attract the crowds they would like to have present. This has been particularly the case as regards dairy farmers.

At the Eastern Convention last week I heard Mr. Kidd, who lives right close to Ottawa, remark that he could see only one dairy farmer in the Convention that he knew who came from the country around Ottawa. There is a feeling that the dairy interest in the Province is rather limited. There is a place between Eastern and Western Ontario where they have not gone into dairying to any extent. Both the Eastern and Western Association have had the same object in view. Both have felt frequently that they would like to be in closer touch one with the other, but have not known how to go about it. Another section of the dairy industry that we do not hear about at all in connection with this Convention are the dairy stock breeders. The breeders of the Holstein, Ayrshire and Jersey cattle hold annual meetings, but they never come to this Association, although their interest are almost identical. There seems to be a feeling that the time has come that the cheese-makers and butter-makers should have an organization. The cheese-makers have an association in Wisconsin. They receive a grant and issue an annual report. All the cheese-makers attend from various parts of the State. We do not know in Western Ontario the conditions that exist in Eastern Ontario. Mr. Paget was on Institute work in Eastern Ontario. He was surprised to find that they had 22 cheese factories in one section down there ten miles square. They had some cheese factories there that make only one cheese a day. I was told that at one factory they made cheese one day and they stopped for a day and made the next. If we can get together and give the Eastern men a chance to find out what we have here in the West, we might expect better results.

The second question is, "Can we make a success out of the Exhibition if we attempt to hold one?" You will recognize that this is important. Perhaps the best reply to that is that shows of this kind are held in New Zealand, United States and Great Britain. I have in my mind a report of the New Zealand show, and the exhibition of cheese and butter and dairy produce have been increased from year to year. I also have in my hand the report of the Butter-makers' Association in United States, and a report of the show in Great Britain, and they are very interesting reading. They hold all kinds of competition in butter-making and milk. They bring in all the dairy interests, and the fact that these very countries have been able to make a success of their Exhibition would seem to indicate that we ought to be able to make a success. When the Winter Fair was first held there was a feeling that it would not be successful. There were a lot of men predicted that it would not grow, but it is growing every year. We have an example in the Horticultural Exhibition. I had the misfortune to be the Secretary of that Association, and a number of people said, "You cannot make a success of that show." We have not had as large an attendance as we expected, but the results that have been accomplished have been astonishing, and the attendance is doubled since the first year.

I think we could make a great success of the dairy show. We hear a great deal about testing dairy cattle, and this is one of the most important questions before us. A dairy show would bring out high class cattle and we could hold dairy tests at the show. We would have a good show of such animals as Professor Dean told us about that produced 12,000 pounds of milk.

These are facts that every farmer would have an opportunity of learning. We would have the producers of these cattle at the meetings, and have them on the platform and have them discuss the different points, and we could have leading speakers from the United States as well as our own Professors. These are some of the thoughts that occur to me in answer to these two questions "Is it needed?" and "Can we make it a success?"

Mr. Barr: Do they recommend one central board to conduct the entire business of the Province? I think that is something we should discuss.

Mr. Paget: That matter was considered by the commtitee, and the opinion of the committee was that while such an exhibition at a central place apparently is needed, it would not be in the best interests to conduct the exhibition without having local organizations both in Eastern and Western Ontario for what might be considered the field work,—coming in contact with the local conditions of both parts of the Province. But for the fair a central organization might be elected similar to what has been adopted in Eastern Ontario during the past two weeks; that is, that a representative should be chosen by the dairymen in a certain district. The territory covered by the Association of the Eastern Ontario was recently divided into districts; a meeting was held in each district to nominate a representative whose nomination would be ratified by the convention held in Ottawa. I think it was in the minds of the committee making this report that some such plan should be adopted whereby the dairymen in every locality would have a voice in constituting this executive board.

Mr. Cowan: This Dairy Show would be conducted very like the Show in Guelph; the Western Association and the Eastern Association to appoint delegates, and the Stock Associations would appoint delegates to the fair, and the work of the Eastern and Western Association would go on the same as before.

Mr. Barr: I have been giving this question some thought. If the arrangements were so that we would have a Central Board in Toronto to manage our National Exhibition and still leave the field work in Eastern and Western Ontario under the supervision of the present Associations, and the Associations to devote more of their time to holding district meetings and trying to make them larger and more interesting, it would be a good thing. We could have ten meetings distributed over Western Ontario, and if the Association spent their efforts along that line, I believe it would be to better advantage than the way we are doing at the present time. I believe we could offer a prize for a dairy herd competition in each section. I do not think that the work of the dairymen in Ontario ought to be managed and controlled by a Central Board from Toronto, but if we would devote our efforts largely to field work and drop our conventions, I believe we would be doing better work.

Prof. Dean: If I understand these Winter Exhibitions are to take the place of the meetings held by the Eastern and Western Dairy Associations, I would hold up both hands for it, because going to Ottawa one week and coming to Western Ontario the next week breaks a good deal into my work at the school, and I see no reason why one meeting would not do for both Dairy Associations. I see no reason why the Dairy work of the Province of Ontario could not be managed by one Dairymen's Association. I never could see any reason for having an Eastern and Western Dairymen's Association. This country is surely broad enough in its ideas to do away with these petty local jealousies which are found more or less east and west. Surely we have enough broad minded men to take hold of that dairy question and have the dairy business of Ontario managed by the one board.

A Member: At what time of the year would it be proposed to hold that meeting?

The Chairman: Some time during the winter, but after the beginning of the year.

A Member: It is not the intention to hold it during the Fair at Toronto?

The Chairman: No. I would like to have a standing vote. I would like you to show the Minister of Agriculture who is here the feeling of this meeting.

The report was carried unanimously.

SANITARY INSPECTION.

Mr. T. J. Dillon, Sanitary Inspector, reported as follows: All of us who handle milk products know that everything in connection with it should be clean. The man who milks the cows should be clean, the food and water given the cows should be clean, the utensils used and the place where the milk is kept should be clean and sanitary, and, by no means the least, the place where they manufacture the cheese and butter should be clean and sweet. Old rusty cans should not be used for the purpose of carrying milk.

The butter in Western Ontario could easily be made worth two cents more a pound by a little more care. The people pouring into this country, and the local demand, is taking nearly all the butter we manufacture; some day there will not be such great demand for cheese, but more demand for butter, and then we will find where we are at in connection with the butter trade. We are not producing the finest butter that could be made in this Province, and it is time we were thinking about making better butter. People who know something about it will tell you that the butter manufactured in Western and Eastern Ontario is not as fine a quality as it might be, and we should make the best.

When I started out in the summer I thought that there would be four or five patrons in a factory that would require a sanitary inspector to look over their premises. The man in charge of the factory ought to be able to get almost every patron reasonably right with the regard to sanitary inspection. I found a great percentage of these factories where there are more than five or six patrons requiring a sanitary inspector. They should be all clean and tidy and up to date. Milk is an important article of food.

It costs money to produce milk, and it is surely worth while to take care of it after going to the trouble of producing it. I found cheese-makers using a bad smelling, old milk starter, putting it in milk that was already over-ripe. That is the cause of a great deal of waste. In districts east of Toronto, I found that some cheese-makers were cooking the curds up over 100 degrees; one man was cooking the curd at 108 degrees. There is a lot of good stuff that goes out to the whey tank, the butter-fat is run off to the whey tank, and you have then a dry, hard flavored cheese. The cheese made from over-cooked curd is seldom insipid, but never fine. In many cases it takes a half pound more milk to make a pound of good cheese than it should. I would say this is rather expensive; there is a large percentage of waste. It is an old saying in Ireland that "the pigs pay the rent," and they will pay a great deal in this country if they are kept right, and if the waste at the factory was used up. It would pay the factorymen to employ somebody to see that the whey tank is kept clean.

There has been much boasting about the quality of Ontario cheese in the last few years. A number of our people, think we are making cheese of as fine a quality as can be made, but unfortunately that is not the case. I have seen English and Scotch cheese made under the same system as ours selling at from 78 to 80 shillings per cwt., when ours were selling at 67 and 68 shillings, and that is quite a difference. Some of the difficulty may be accounted for by the local conditions. We can overcome some of the conditions by cool-curing our cheese, and by having better transportation facilities, but the main part must be overcome by the milk producer and the manufacturer. Our dairymen are better organized than in any other place in the world. We cannot reach perfection, but there is no reason why we should not work as near perfection as possible.

There was a move made last spring to get after the careless men by appointing two sanitary inspectors, and we were given authority. The sanitary inspectors were employed for about five months in the year to visit the factories and the careless milk producers in the Province. Ninety per cent. of the factories visited were in good shape. Two men might have covered the ground had some arrangements been made with the instructors whereby the Inspectors could have been placed where he was most needed, but it is simply impossible for two men to visit all the factories in this Province in the summer season. Some recommendations have been made by the Eastern Association and this Association that all the inspectors should be made sanitary inspectors. The matter will come before the Legislature at the coming session, and if they are all made sanitary inspectors, we will have about forty, and these men would be able to do the work more thoroughly than two. The very first question that would come up would be, "Are these men capable of doing the work?" They will be given the power of judges, and they will be called upon to decide many questions in connection with the work, and whether they are all fit for the position is the question. It is to be hoped that they will do their duty regardless of what anybody has to say, and I hope they will be able to decide questions between man and man, because, once these decisions are given they cannot be undone.

Mr. Geo. W. Neely, M.P.P.: You are gathered here from the different parts of Western Ontario, for the purpose of doing each other mutual benefit, and when men put forth their energy as you are doing, I am sure you will meet the success you deserve. Men whose interests are identical can always benefit each other very much by interchanging opinions. I am sure I have been edified since I have been here, by listening to the different speakers, and those of you who hold a more comprehensive idea of the dairy business would likely gain more information than I would. I was very much interested in listening to Mr. Whiteley, who so ably advocated the testing of cows. I think that is along the line that will effectually redound very much to your credit. I think this particular phase of your educational work is going to produce a great deal of good.

As an illustration of the benefits that might be derived from continual testing, I might call attention to the history of the American trotter. These horses are now all sought for all over the world, and their success has been largely brought about by keeping accurate records and conducting tests under authoritative conditions, so that there could be no disputing the facts, and when Mr. Whitely tells you that Denmark and other countries have produced cows that will give 10,000 and 11,000 pounds of milk in the same period that cows in this country give 6,000 and 7,000 pounds, that should be some incentive for the dairymen of this country to continue along this line. I can assure you that is the very mode and manner by which you will develop this class of cows the best.

Some men object on the ground that there will be a great deal of trouble testing, but I can assure you that your trouble will be repaid, and it is much more important to test where you have a large number than where you have a few, because only in that way can a man keep in touch of a whole herd of cows, and by testing he will become interested in his work, and he can weed out the cows that do not pay him..

Another matter that I see cropping up in the dairy papers, is that of sanitary inspectors. At the request of the Eastern and Western Associations, the Government appointed two sanitary inspectors, in order that the factories might be put on a sanitary basis. I have driven throughout this portion of Ontario, and I have frequently noticed cheese-makers drying their cloths out in the sun, and I think that is a very careless and slovenly looking habit. If the factoryman is not clean, how can you impress upon the farmer the necessity for cleanliness? It has been advocated that the instructors should be sanitary inspectors. If their usefulness has ceased, then I think it would be better to cut them off altogether, rather than clothe them with the authority of inspectors. I feel that if you would make the instructors inspectors, their duty as instructors would about end. I think the cheese-makers ought to exercise a great deal of care in educating their patrons as to what cleanly and sanitary conditions ought to be. They ought to visit the barnyards more than they do, and try to instruct the farmer as to what should be done to make things more sanitary; and if they would do that I think they would find a great deal of improvement. I think neighboring factories should be honorable with each other. If a cheese-maker tries to correct a patron who is on the border line between two factories, the patron may say, "I will go to the other factory," and if the other factory holds out a welcome hand, that patron is lost. I think factories should be more honorable with one another. I think we should make a more uniform article, and if the cheese were sold on their merits we would get a better price for those in the best factories; but our cheese are all sold as Canadian cheese, and if a grocer gets a poor cheese from one factory, it is all Canadian to him, and he discounts all Canadian cheese, and therefore we must look well to the quality of the product we are producing.

You cannot keep the farmer too closely linked with you. There is a tendency to create a sort of close society in connection with these matters, and to separate yourself from the farmer. You should go the other way and keep close to the farmer. (Hear, hear.) Cheese-making is one of the ramifications of the agricultural industry of Canada, and you cannot do any good by getting away from the source, or the man who produces the milk which you manufacture. I have often thought that the cheese-maker thinks he is a different class of man from the farmer, but that is a mistaken idea.

The CHAIRMAN: The next thing on the programme is an address by the Honorable Minister of Agriculture, and we are delighted to have him with us. Since he has been Minister, the Association have had the best of thought from him, and whenever we have approached him, no matter how we approached him, we have always been received in the most kindly way by the Honorable Mr. Monteith. I am sure he is delighted to come and meet with the dairymen and give us some advice.

ORGANIZED AGRICULTURE.

BY HON. NELSON MONTEITH, MINISTER OF AGRICULTURE, TORONTO.

I am sure that I can say with a great deal of truth that it is a great pleasure indeed to be here. First, because of the gentleman who is holding that noble and dignified position of presiding officer over this splendid organization known as the Dairymen's Association of Western Ontario. It is not the first time a Ballantyne has been honored in that way. (Applause.) His worthy sire was one of the pioneers in this great work of dairying. He was one of those who early saw a future for this great industry that stands for so much, and has done so much for agriculture in this fair Province. I am glad that he has lived to see the fruition of his prophecy.

We are indeed singularly fortunate in being asked to meet in this splendid city. It is a privilege and a pleasure to me especially to come back again to this old city of London, where as a boy I spent a few winters trying to add to my store of knowledge. I have been singularly fortunate in having the glad hand of fellowship extended to me by agriculturists throughout this Province, irrespective of political sentiments. I am glad that they recognize that the great Department of Agriculture should be, as far as possible, divorced from active political influence. Agriculture has a record in this Province of Ontario, and I feel that I have a great responsibility in keeping it up to the high standard it has attained in the past.

Organized agriculture is not a thing of yesterday. You can go back over one century in the history of this Province and trace back organized agriculture. Shortly after Government was organized, a society was formed in the Niagara District, although I do not doubt that some agricultural ideas were transported by those loyalists who settled along the western shores of Lake Ontario, and possibly were put into practice prior to that date. However, one of the historical events relating to agriculture, that we are sure of, is the organization of an agricultural society, or a society for the promotion of agriculture in the year 1704, down in the Niagara District.

Since then I think I am safe in saying the progress has been steady—fitful at times, accelerated at others. We are to-day in the proud position that we can say we are producing a greater amount of agricultural value than we have attained previously. This great industry has accomplished much to allow us to make the progress that we have. You will note its steady progress. It was largely through the Agriculture and Arts Society, an organization that in its day did much in furthering the science of agriculture. Later came upon the stage an honored citizen of this city, the Hon. John Carling, who planned out our Agricultural College to some extent, an institution that was erected for the purpose of experimenting along agricultural lines. Later on the work was well carried on by the Hon. John Dryden, and the men whom he gathered around him. Now, we have come to a position of affairs where your humble servant has to take up the work, and I tell you frankly that the Agricultural Department to-day is a very wide-spread institution. It touches a great many things that come very close home to the average citizen of this Province of Ontario. We have the two great dairy organizations, the Eastern and the Western, and while I am not in a position to say what you should do in the way of uniting, I can say that you are maintaining, under the present condition, a fairly high standard of output. You heard what was said in Ottawa just the other day by Prof. Robertson and Mr. MacLaren, M.P. They stated that they saw no reason why the present position should not be maintained, provided that you keep up the good quality of cheese; and I believe I am safe in saying that we can maintain the high prices for the production of our fields and flocks and gardens, and for every other agricultural production. The home consumption is beginning to have an appreciable effect upon food values.

These are some of the things that, to my mind, give us a good deal of encouragement to do better in the future than we have done in the past in the line of producing articles of excellent quality; because quality means so much in increased values and increased consumption. Now, it is said that we are spending a good deal of money. The Government of the day are your servants, and they spend the money coming from the consolidated revenue and the subsidy paid by the Dominion. We are the medium through which those vast sums of money are supposed to be spent for the betterment of the people of this Province. The Department of Agriculture to-day has the responsibility of paying out, almost a half million dollars. Last year our appropriation amounted to $460,000. That vast sum of money has been paid out in many ways, yet every dollar of it requires to be justified under our system of Government, on the floor of the Legislature. So that you see the responsibility all comes back to your humble servant as paymaster. The dairy industry is receiving, almost directly, a large part of that vast sum. Last year the dairy branch in its numerous ramifications received about $65,000. As you are well aware, there has been somewhat of a change in the method of expenditure. There was a time when the two organizations, known as the Eastern and Western Dairymen's Associations, dispensed and paid out, to a large extent, the appropriation given for dairy purposes. At the present time, outside the expenses of holding your convention, the other accounts are largely arranged from the Department, and Mr. Putnam, who has charge of that branch, to a large extent, has the responsibility devolving on him of seeing that the details of this matter are properly worked out.

We have under consideration here to-night the question of holding a National Show, and the evidence seems to be all on the one side. No one has pointed out the difficulties that might arise from this momentous experiment, which we have been urged to undertake. I am often called upon to give advice. I honor the farmers of this county, I revere them, because of that sturdy manhood, of that quality of stability that is in them, that goes to make up a progressive and aggressive people. The farmers of this country are slow to move. I do not mean that they do not work rapidly, because I know that a great many of them work a great deal harder than people who live in the cities. They are not a people who go abroad very much. They are not given to leaving home. I can just tell you, from my experience, that, if you can get them out to one winter exhibition through the year, you are doing very well.

You remember the story of Mahomet and the mountain. He ordered the mountain to come to him, and when it did not move he said, "If the mountain will not come to Mahomet, Mahomet will go to the mountain." This is the position of the farmer, and my idea is that you will pretty nearly be compelled to bring the two shows to the farmer in order to get him to attend. While I believe in specializing, yet I believe that it would be well if we could arrange to have our exhibition consolidated, and have a horse show, dairy exhibition, stock exhibition, and a poultry show, and have them centralized, as reasonably as possible, so that, if a farmer went out for a week, he might see all of them; because that is the way farmers are beginning to do regarding Guelph. They go there and study poultry and live stock, and they spend a week there, and in many cases, this is the only outing some of our farmers take through the whole year. It becomes an educational outing; and if you are demonstrating the dairy industry at some central point, so much the better. But do not try to cover too much ground. Do not get too many shows, or you will lose interest in them. Much hard exertion is required to reach the people. Much unselfish effort must be given in order that the people of this Province may be roused up to the responsibility in the line of production in this great industrial chain.

I think, that, after all, the most important man is the man behind the cow. He is the starter of the whole machine, and I believe the farmers should waken up in the matter of selection. It is well to show a man how this selection can be carried out more expeditiously than in the past. The farmer is beginning to weed out the poor cows, he is beginning to realize that many of the cows are not giving the quality of milk that they should. He has a great responsibility upon him in giving the cheese-maker a good article. On the other hand, the maker is responsible to the patrons, and if he receives any information from time to time it is his first duty to communicate that information to his patrons, and point out the methods whereby the production of the cows may be increased. Advise them as to the wisdom of having a continued suppy of fodder, and as to housing the cows in a more comfortable way as to ventilation, and a great many other things. In fact the cheese-maker is a great man in the community if he rises to his responsibilities. He can become a leader and a benefactor. I believe many of our young men who are taking up this work as a life work are destined to do great work along this line. Then we have responsibilities at our end of the business, because after the farmer and the maker then the responsibility is up to the Government. I feel that it is the duty of the Local Government to do the educational work, get the latest ideas that have proved profitable in the industry, and put it in the hands of those who can spread the knowledge. The Federal Government have the responsibility of seeing that there is a constant chain of communication between the manufacturer and the consumer, and that there is no loss of quality in handling it to the consumer in the old land.

I am glad to be with you, and to hear the discussion we have heard here to-night. It has somewhat prepared me for the duel that will be fought out when your delegation comes along. Let us ask ourselves, in mutual confidence, "Are we ready to take that step?" To my mind we have possibly over-stepped the mark. It was brought to our notice at Ottawa as to our right to inspect, as to whether we have not exceeded our jurisdiction in that. Some factorymen say, "You ordered us to make several alterations and changes in our factory, and we feel that when you demand that we should do certain things, we should get something in return. We feel that you should in doing that designate that we have certain rights in certain premises, that we should control the making within certain districts." That is one of the arguments produced, and while it may possibly be to our best interest, yet one begins to realize the difficulties that would be met with. Let us take it into our consideration to go the whole length of licensing factories, compelling them to pay so much as a license fee. Go still further, and compel the makers to have a license. Have every instructor an inspector. These things all lead out to one or two possibilities, and the question is, are we ready for them yet? The results would be rather a campaign of compulsion. I think possibly our campaign of education might be carried a little further, and the public mind prepared for these things before we grapple with them aggressively. I do feel that, at the present time, sanitary inspection has become almost an absolute necessity. Our inspectors have carried on their work without a serious amount of friction. It has been a notable fact that those to whom the responsibility of sanitary inspection rightly falls, namely our local Boards of Health, have failed to a very large extent, in compelling factories to come up to the proper requirements, hence the necessity of having legislation to deal with this matter to some extent. There is an argument in favor of the owner of the factory and he may have ground for complaint. Inspectors have it in their hands to compel the producer to come up to a certain standard in the matter of production, and thereby relieve the maker of the responsibility of jogging up his patrons. It appears to me that, as yet, we have not accomplished all we wish in regard to factory inspection, but I think it is worth while trying for a year or so further, before we attempt to make every instructor an inspector. I am afraid that bond of confidence that has sprung up between the maker and the instructor, would be sadly shattered should a change be made in this regard. We had better experiment with a lesser number than with a greater for a short time at least.

These are a few simple facts that struck me, I being the one who has to bear the brunt; because, after all, the money expended in these things is the people's money, and we are responsible to the people for every action that is taken; so that you can understand the need for caution on the part of a public man. I am only one of a number, although in matters dealing with my Department, as a rule, what I say is somewhat of law. I have always found the dairymen to be moderate in their requests, and I have always felt that it was one of my first duties to see to it that this great dairy industry, that has become the backbone of our great agriculture, should be well considered, but that, as far as possible, nothing should be done to cause a reaction or a backward step. (Applause.)

NOMINATING COMMITTEE.

The following gentlemen were then appointed as a Nominating Committee: Robert Murray, James McIlwraith, George Boyes, Alexander Clark, Wm. Waddell.

REPORT OF INSTRUCTION IN 1906.

By George H. Barr, Chief Dairy Instructor, Strathroy.

I take much pleasure in presenting my annual report of instruction in Western Ontario. The season of 1906 is one which dairymen will no doubt long look back to as a great year for high prices for cheese. The Instructors will remember it as a year in which a lot of hard work was done by them on account of the very hot spells we had, and I want our cheese-makers to remember it as the year they did better work than any previous year in the history of the trade.

At no time during the season did our makers get *off the track.* Notwithstanding the dry hot spells, which were frequent, we had scarcely any acidy cheese, which is the first year since taking charge of this work that I am able to make such a statement. Fewer cheese have been rejected than in any previous year. I will not say that the quality of our summer cheese was finer than a year ago, but I will say that taking the weather into consideration our makers did better work than a year ago and our fall goods were never finer.

Without a doubt, our cheese-makers are handling over-ripe milk better than they ever did. They are also selecting the milk closer at the weighing stand, returning that which is tainted and over-ripe, and I trust they will still continue to improve in this respect. But even these improvements will hardly account for all the success of the past season.

I believe the fact that our buyers have taken the cheese out of the curing rooms earlier that they used to has something to do with improvement in quality. No doubt many cheese are shipped out too green and are a detriment to the trade; but the main point to note is that our cheese must not become heated in any way, and this should encourage our factorymen to put up cool curing-rooms as quickly as possible, so that our cheese may be kept safely at the factories until they are well cured before shipping. Proper curing-rooms at the factories would mean less tendency to ship green cheese.

I will not weary you to-day with the details of our instruction work which will be given fully in the Convention report.

A summary of these details show that 161 factories were visited regularly by the Instructors, 10 less than in 1905. 873 day visits were made and 398 calls, making 1,271 visits made to the factories, which is 366 more than in 1905. 2,648 curd tests were made, 20 more than in 1905. 43,730 Lact. tests, 6,420 more than last year. 2,594 Babcock tests, 1,524 more than last year. 505 patrons were visited, 85 less than in 1905. You will thus see that our instructors have been doing more milk testing than last year and less work among the patrons. This is not their fault, as they were anxious to visit patrons, but could not always make arrangements with the makers or factory men.

The Instructors felt very much discouraged with the results of visiting farms in 1905; there were few improvements made in regard to moving milk stands or in the method of taking care of the milk, and tainted and overripe milk was still being sent from these farms, no attention having been paid to the suggestions made by the Instructors.

It may seem somewhat arbitrary and harsh to compel this kind of patrons to change their methods, but I believe the milk sent to cheese factories by such patrons is doing so much injury to the quality and quantity of our cheese that some such action is justifiable.

During the year I attended 41 annual and special meetings. 21 annual meetings were attended by the Instructors, making a total of 62 meetings with an attendance of over 3,000. Attending these meetings I consider of very great value to the industry. At no other time can we reach the patrons as well as at the annual meetings, and a friendly discussion with them regarding the care of milk has made wonderful improvement in the quality of the milk delivered during the last season.

The total expenditure for repairs and new factories was $28,750, or $6,283 less than last year. There is a decided improvement in the floors of our factories, and the equipment is improving as fast as profits will allow. The worst feature about our cheese factories is the whey tanks, and it is difficult to know just what to do to remedy this defect. I would strongly recommend that the dirty washings and slush from the factory floors be run into either a separate tank or drain.

I would also recommend that there be only one tank in the ground, and it should be made shallow, not more than four feet deep, so that a drain may be run from under it where possible, so that it can be cleaned out easily, and the whey elevated to a larger tank to load from.

There has probably been a greater improvement made in the milk cans than in any one thing during the past season, and where the cans are improved the quality of the milk is also very much improved. We must still keep up war against rusty and unclean cans. *Clean whey tanks* and *clean cans* are the two things essential to securing a pure milk supply.

In the cleanliness of the factories there is still room for improvement. Many of the curing-room shelves are not kept clean, thereby staining and marking the cheese, giving them a bad appearance. There could also be a decided improvement made in some places in the tidiness of the curing-rooms. Many of our makers spent a good deal of time in the spring painting the piping and equipment and whitening the walls, and I am pleased to say this feature is growing rapidly.

I have heard very few complaints about boxing the cheese. We still have too many poor cheese boxes, but I believe our factory men are making an effort to get a better box.

During November and December district meetings were held in each instruction group. These meetings were very interesting, and we trust helpful in promoting a better feeling among factory men and makers as well as giving us all a wider and more liberal view of things relating to the dairy industry.

The subjects which seemed to be of the most interest to those attending these meetings were: The advisability of making the Instructors Sanitary Inspectors, testing milk for adulteration, better prices for manufacturing, and dividing territory between factories, or having an understanding with one another in regard to the returning of milk. At four meetings a resolution was passed and signed by 42 factory men that they would make an effort to divide territory, and agree to leave one another's patrons alone. Since the meetings were held I have letters from 13 factory men who were not at the meetings approving of this proposition. All the meetings passed resolutions approving of making the Instructors Sanitary Inspectors in 1907.

I again commend and thank the staff of instructors for the efficient manner in which they did their work during the season. Many times the work is difficult and trying, but there have been scarcely any complaints made to me during the past season regarding the Instructors' work.

I am sorry to say that several of the staff have resigned and entered into business for themselves, but we hope to secure capable men to succeed them.

The relation between myself, the Instructors, and the Board of Directors has always been of the most pleasant and helpful nature, and I can say the same in regard to the cheese-makers, factorymen and buyers.

Group.	Instructor.	Number of Factories Visited.	Number of Visits.	Number of Short Calls Made.	Number of Curd Tests Made.	Number of Lactometer Tests Made.	Number of Babcock Tests Made.	Number of Patrons Visited.	Expenditure.
Ingersoll....	Jno. H. Scott...	23	118	82	279	4518	581	102	$8240
Woodstock .	Frank Herns....	21	115	83	337	4672	28	115	5685
Simcoe	Geo. Travis.....	21	120	23	112	6474	194	13	850
Brantford...	R. H. Green....	22	116	46	145	6721	651	13	3395
Stratford ...	Alex. McKay...	22	127	51	592	4980	248	78	3470
Listowel....	J. R. Burgess...	20	110	81	494	6539	114	83	1630
London.....	W. Waddell....	22	118	30	596	7334	688	54	4410
Kincardine .	E. N. Hart......	5	29	2	191	1935	46	47	1070
Outside Factories .	Geo. H. Barr....	5	20	.....	2	557	44	....	....
	Total.......	161	873	398	2648	43730	2594	505	$28,750.

INSTRUCTION IN CREAMERIES, 1906.

This year there were seventy-four creameries in operation in Western Ontario, three more than last year. The new ones are Glencoe, Lucan and Wheatley. Fifty-three were visited regularly during the season, the same number as last year. Calls were made at eight of the others by the Instructors.

Out of the seventy-four creameries in operation only five can be called separator creameries, and even at these there is a small quantity of cream gathered cream received.

Eleven others are skimming some milk but cannot be called separator creameries, as the quantity of cream gathered is about as much as that separated at the creamery. The balance, fifty-eight, are entirely cream gathering creameries.

In 1904 only thirty-four creameries were using the Babcock tester; in 1906 fifty-six were using it. My own opinion is that it would be a good thing for the creamery industry if it were made compulsory to use only the Babcock tester for testing cream at the creameries, as its use tends to improve the quality of the cream.

Only one creamery (Brussels) in Western Ontario, and so far as I know the only one in Canada, has adopted the method of weighing the cream sample for the Babcock tester. The proprietor, Mr. Harris, is very much pleased with the results in that his patrons are much better satisfied with the tests.

One creamery (Walkerton) paid a small premium to the patrons for delivering cream testing 25 per cent. and over. The result was a considerable increase in the percentage of fat, and an improvement in the quality of the cream. These things show that some of our creamery men are becoming more alive to the importance of advancement in the methods of managing their creameries.

I am very sorry I cannot say there has been an improvement in the quality of the butter in 1906. This fact I believe is due to the warmer weather during the season, and also that some of our creameries are only collecting the cream twice a week. The reason given for collecting only twice a week is they are able to cut down expenses and are able to pay a little more to the patrons than their opposition.

This feature if continued will result in giving our butter even a worse reputation for *old cream flavor* than it has at present. In looking for a reason why our butter has not as high a reputation for quality as our cheese from Western Ontario, I am forced to the conclusion that our creamery men have not set as high an ideal of perfection in quality, and made everything count for that end, as have the cheese men.

Until our creamery managers come to some understanding with one another in regard to the question of refusing cream that is over-ripe and rank in flavor, there is little hope of improving the quality of our creamery butter.

There is as great a weakness in the cold storage at our creameries as in the curing-rooms at the cheese factories, many of them cannot be called cold storages, as the temperature is reported from 50 to 60 degrees in some cases. We must have storages at the creameries that will keep the butter at 40 or 45 degrees even if it is only kept for two or three days.

Some of our butter-makers pay too little attention to finishing off the top of the packages, and when they are opened they present an untidy appearance. I believe it would be a good thing for our creamery business if the creamery men would only use one style of box for export butter, and have a distinct creamery brand on each box, so that there would be a distinct difference between a 56 pound box shipped from a creamery and a 56 pound box shipped from a store containing dairy butter.

Quite a number of creameries are using coolers for cooling the cream as it is delivered at the creamery, and they are giving the best of satisfaction. There is no apparatus in the creamery equipment that will give better results than a cooler and plenty of water to pump through it. A number of the creameries are using pasteurizers, and there is no doubt that they assist greatly in securing a uniform quality of butter, but to get the best results from pasteurizing the cream must test at least 25 per cent. fat.

Our butter-makers are adopting more uniform methods in churning and washing the butter, with the result that they are getting larger returns from the cream. Mottled butter seems to be the butter-maker's greatest difficulty in the making of the butter, and it is difficult to suggest a remedy. I believe greater care should be taken in washing the butter and in distributing the salt than many of our butter-makers exercise.

In conclusion, let me say that although it seems slow work getting the quality of our Western butter improved, there is progress being made. The patrons are becoming better acquainted with the requirements necessary to produce good cream. Our makers are adopting better methods in the creameries, and our creameries are better equipped.

What we need to-day is a determination on the part of our creamery men to use every means available to make our Western Ontario butter second to none.

I thank the creamery instructors for their earnestness in carrying on the work among the creameries, and also the creamery men and buttermakers for their co-operation.

Group	Total creameries	Visited Regularly.	Number Visits.	Calls.	Sep.	C.G.	Both.
Western	28	23	120	7	3	19	6
Northern	20	16	91	7	....	18	2
Eastern	26	14	69	1	2	21	3
	74	53	280	15	5	58	11

Group.	Oil Test.	Bab.	Comb.	Box.	Patrons Visited.	Expenditures.
Western..............	3	25	23	5	269	$ 8,985
Northern.............	9	11	15	5	545	11,035
Eastern	5	20	23	3	137	1,150
	17	56	61	13	951	$21,170

I have had very few complaints, and I think the work has been satisfactory. If it has not been, let us know, and we will try and make it satisfactory in the future. If you have anything to say do not be afraid to say it. It is only by close criticism that we will be able to do the best work for you. I am very sorry that we are losing some of our men. I find it difficult to get all round men. The relations between myself and the Board of Directors have always been of the very best. (Applause.)

Mr. McLeod: Mr. Barr said that less factories asked for instructors than formerly; are there less factories, or how is that?

Mr. Barr: No, we have two new factories in Western Ontario this year, and one factory changed from cheese to butter, which makes it just about the same number of factories. In Western Ontario we have 220; 10 less asked for instruction this year than a year ago. We did not have much complaint about the work, but some of them thought they would like to try a year without an instructor to see how they would get on, and they would save that much money. We have no objection to their doing that. We would like to have them in, but at the same time they are the conductors, and there were ten less visited this year than a year ago.

A Member: Do you think we should compel all factories to employ instructors whether they wish to or not.

Mr. Barr: It is the proposed change for next year. I understand Mr. Putnam will take that matter up, and as he is nearer headquarters than I am, it would be better to let him speak on that subject.

The Chairman: The next subject on the programme is Dairy Instruction for 1907, by Mr. G. A. Putnam, of the Department of Agriculture.

During the year a committee of the Eastern and Western Dairymen's Associations met Mr. Putnam, and the result of that is the report that Mr. Putnam will present to you to-day.

DAIRY INSTRUCTION FOR 1907.

By George A. Putnam, Director Dairy Schools, Toronto.

I have a most unenviable position this morning in the dual position which I occupy in reporting for the joint committee of the Associations, and in representing the Department of Agriculture for Ontario. I am asked to speak upon "Dairy Instruction for 1907." Dairy instruction is now associated with so many other questions that I must necessarily say something about these other features of the work, especially sanitary inspection of factories.

One would gather from listening to what is said from time to time by speakers, and by what we read in the papers, that we have not made very great progress in dairying in Ontario, but the records show unmistakeably that dairying has made sure and considerable progress during the past decade. The desire of the consumers of the Old Land for Canadian goods, the volume of business and the great increase in price, indicate a healthy growth. Still we must aim for something better, and the dairymen of Ontario will not stop short of something better. On occasions such as this we should give credit to the pioneers who worked faithfully, many of them at personal loss and without any expectation of ultimate remuneration, to establish this industry; and great credit is due, sir, to your sire, and those associated with him, and we are glad to-day to see you, in company with other dairymen, carrying on that good work. The men who are here deserve great credit for the business ability and the persistency which they have shown in carrying on this great dairy business.

I hear it sometimes said that it is difficult to get young men to take up the work of dairying. This is to be regretted, and I wish to say to the young men who are in this business, that I believe they will do well to stay with it. The agitation for some change in our methods of instruction and sanitary inspection and which we have before us for consideration at this time, is bound to result in good; and even though no radical change in legislation or methods is made at this session of the Legislature, we can accomplish much in the interests of the dairy industry by working more agressively along educational lines. We heard last night that the producers after all are of the greatest importance in this business; and it is quite true that the rest of us would be in a poor position if it were not for the large army of good producers which we have in Ontario. They are the essential persons in the industry. We hear a great deal about the lack of cleanliness on the part of the producer, and lack of care in cooling the milk. I think, sir, we can safely say that from 80 to 90 per cent. of the producers in this country are handling their milk in a satisfactory manner and deliver it to the factory in good condition.

I was pleased to hear Mr. Barr state this morning that there is a decided and gradual improvement in the milk supply. That improvement is bound to continue. The farmers of this country are awakening to the importance of taking good care of their milk, not only to better the quality of the cheese but that their returns may be the greater.

There are from 10 to 20 per cent. of the producers who need brushing up in their methods, and it is the duty of the farmers who are producing good milk to brush them up. It is also the duty of the instructors to do all they can to instruct the producer in improved methods, and the duty of the makers to do something more than they have done in the past in assisting farmers to take better care of their milk. I venture to say that if the competent maker who is really interested in his work were to go among his patrons and advise and consult with them and show them clearly that he is anxious to do something to help them to produce a better quality of milk, his services would be appreciated and none would take objection to it.

There are about five per cent. of the producers in this Province who are surprisingly negligent in taking care of their milk. I believe if we brought this five per cent. of poor producers up to the average in the matter of cleanliness in handling their milk and in cooling it, our industry would be placed in a much better position. This is the great question of all lines of agricultural work; to get at the men who are away behind in the race. If we could only get the men who are not following up-to-date methods to improve and produce average milk, then we would increase the value of our dairy products to such an extent that their increased value would more than represent all the money which has been spent for education along dairy lines

I believe the makers as a body are a competent lot of men. They must be a competent lot else we could not send out such a volume of first-class cheese as we did the past few years, and the price would not continue to increase if the makers were inferior workmen. We have our dairy schools, and I am glad to see that larger and larger numbers of dairymen are appreciating the necessity of taking, not only one full course, but going back from year to year and brushing up. We have some 60 students in attendance at Kingston, so many that Mr. Publow, the Chief Instructor, found it impossible to leave his work at this time.

The factories in Western Ontario are in pretty good condition, and that condition is being made stronger and better from year to year, and it is going to be still further strengthened during the next few years. We wish above everything else, to have sanitary factories. A sanitary factory does not necessarily require to be painted or decorated and have expensive decorations and nice gravel roads, good fences, etc. That is not absolutely essential, but where you find a really sanitary factory you usually find these other conditions. It is well for the instructor and the dairymen to look to the surroundings of the factories, because, if you can get a man to take a pride in his factory, you will usually get him to look after its sanitary condition. That old text of Prof. Dean's, in reference to the raw material, is still applicable, "Have clean and cool milk."

What is cleanliness in connection with dairying? You must first remember that the very conditions under which milk is secured are unfavorable. What other food product would we allow to stand in a cow stable subject to dust and odors? What housewife would want the hired man, who had been working all day on some uncleanly work about the farm, and most all work on the farm requires that the man's hands and clothes get dirty, to come into the kitchen and help her prepare the tea without first washing his hands and changing his outer clothes; and yet milk is more subject to contamination than most other classes of food. If you were to say to the average hired man, "Why do you not wash your hands and change your coat before milking?" he would reply, "I would have to wash after I am through; what is the use of washing now?" The very conditions under which the milk is produced, and the ease with which it is contaminated, require that exceptional care be exercised.

The question before us is how are we to get the desired conditions. The Department will certainly consider any representations or recommendations made by this Association. They recognize you as representative dairymen from the different sections, and you have come here at a sacrifice to yourselves. You are deeply interested in the work, and any resolution you may pass in connection with this work will certainly be given due consideration. The Minister of Agriculture gave you almost unmistakably his views regarding this question last night. Still I can assure you he will be glad to receive your recommendations, no matter what they may be; and I would say, consider well your position, take it strongly, stand up boldly for your view of the case. Those who wish to criticize resolutions brought forward should do so here and not after the convention is over. Give voice to your convictions and opinions.

The work of the instructors, sanitary inspectors, and dairy schools has had a most beneficial effect upon the dairy industry; and we are proud of the advance which has been made; but we want to consider now how to make our efforts even more beneficial.

You will remember that it was decided last year that the instruction work and the sanitary inspection should be kept separate. Provision was not made for sanitary inspectors until after the season had begun, and we did not ask the instructors to give us the names of the poor factories with a view to send the sanitary inspector to them. We had given the public our word that the instruction and sanitary inspection would be kept separate for fear it would be detrimental to the work of the instructors. We did get a few tips from Mr. Barr and Mr. Publow as to what sections of the Province were most in need of inspection, according to their view; and we sent the sanitary inspector to those sections with instructions that they should call upon all factories in the locality visited, and show no favors whatever. I think this was a wise course to pursue for the first year.

With reference to the sanitary inspection work of next year, I shall be conservative in my statements as to what the Department will do during the coming season. We may rest assured that every factory in the Province, and we have a complete list of all these factories, will be visited for the purpose of giving each factory a sanitary inspection call; and we will likely make provision for not only one call, but it is quite certain that every factory, especially the poorer factories will receive two or three, and if they are very inferior, they will probably be called upon four or five times. We will be able to use the sanitary inspectors to much better advantage this year than in the past year.

We have on file all the reports made by the sanitary inspectors last year, and they will be a guide to us for the coming season. The inspectors, besides making recommendations as to the sanitary requirements, also in many cases made recommendations as to the improvements they thought would add to the appearance and efficiency of the factories. In our work during the coming year we shall consider the recommedations, which were made from a sanitary view-point; and it will be the work of the Department to see that these improvements, so far as they relate to sanitation, are carried out. If we look at the records of the work of the Department, we will not be able to point to any instance where either farmers, makers, or proprietors were unjustly dealt with. We do not want to do anything which would appear even to be unjust to any man; and I think we can all rest assured that, whatever action is taken by the Department or Association, no person will have any injustice done to him. It will be necessary to deal rather severely with some men if they do not do that which is recommended, and it will undoubtedly be in the interest of the whole trade. I think we are safe in making that broad statement. It is just possible, and I gather this from what the Minister said last night, that the sanitary inspectors and instructors will be kept separate. If this is decided upon, we can rest assured that those taking instruction will not be discriminated against; in fact, I take the liberty of intimating that if there are any favors shown at all, it will be to the factories that take instruction. We shall make certain that the men who do take instruction shall receive their due share of the visits of the sanitary inspectors.

In talking with Mr. Barr and Mr. Publow and dairymen from many sections, from time to time, I gather that there is a feeling that some little change should be made in the method of instruction and sanitary inspection. With the view of getting the definite opinion of the Associations with regard to the matter, I went before the meeting of the Board of Directors at the time of the Toronto Exhibition last fall and placed before them a suggestion that a change in methods be recommended. This was fully discussed and with the result that they appointed committees who met at a later date, November 8th, in Toronto; and after discussing the question thoroughly, they decided to make recommendations such as you will find in the report which I shall have the pleasure of reading to you. Any recommendations made by that committee are agreed to by me so far as I represent the Associations, but the recommendation of that committee cannot be considered as a recommendation from the Department, although I am a member of the committee. You see my strange position, being a member of that committee and also a representative of the Department.

Whatever regulations are adopted, the greatest difficulty will be experienced in carrying them out in such a way that they will be of the greatest benefit to all concerned.

[Mr. Putnam then read the recommendations, which appear on page 88 of the Report of the Eastern Association.]

Just a word in conclusion. These annual conventions are occasions of great interest to the dairymen, and I am sorry we have not larger numbers here. However, those of you, who are here, are not only acting for yourselves, but you are acting for the large body of makers and producers throughout the country; and those who are not here will read with interest the recommendations that you may make and the action you take, and for that reason I wish to impress upon you the responsibility which rests on your shoulders. We should, at these annual conventions, raise up a standard to work towards. "We make our ideals, and then our ideals make us." If we have a high ideal before us we will have something to look up to, and a definite object in view. Our ideals today should be that every factory will be properly equipped, every maker efficient, every farmer a producer of first-class raw material. These are the ideal conditions which we have before us, and it remains with your association to recommend to the Department the methods which will result in these ideals being attained. We will work towards our ideals and we will win out in the end.

The CHAIRMAN: You have all heard the recommendations of this General Committee, and it is our purpose to have these approved of, or disapproved of at this convention to-day, but before we do that we want to have free discussion. It is a live question among factorymen. There is plenty of time to have the discussion, and there are prominent cheese factorymen and owners of factories and dairies in the western part of the Province present.

Mr. S. A. FREEMAN, Culloden: I am not a cheese-factory man or an owner of one, but, at the same time, I am a dairyman, and I am interested in a certain general way in the value of cheese, and I would like to see the standard kept up and the prices kept up. I do not send my milk to a cheese factory, but I send it to a factory where they require a better quality of milk than a cheese factory. I rise to criticise the last speaker in a small way. He says that he finds so many patrons sending in poor milk, and then he goes on to tell how Prof. Dean says they should have clean milk and cool milk. If there is anything in this world the cheese factories want it is clean milk and cool milk. I have found it is not a very great task to cool milk, and I know the difference between milk that is cooled and milk that is not cooled. I can cool it for one cent a hundred. I have a cement tank set down in the ground, and a good drain from it. We wash our cans in this tank, and then clean it out, and we set our milk in there. I have a windmill and a cement supply tank that will hold abundance of water. I set the milk in this tank in the evening when we are through milking, and I go in and get my supper, and then come out and give it a stir up, and pull out the plug and let the water out and let fresh water in and the milk is cooled down to 70 degrees.

A Member: How cool did you say you got it?

A.—Seventy degrees.

A Member: That is not cool enough.

A.—It is a great sight better than yours that sits in the can, and is not cooled at all. (Applause.)

The Member: I cool mine and take the thermometer, and see that it is down to 65 or less, and mine goes to the cheese factory. (Applause.)

Mr. Freeman: Then you are a good man, and I would like to shake hands with you. I ventur to say they are not after you.

Q.—Do you cool your morning's milk to 65?

The Member: No, I do not.

Mr. Freeman: Then I am ahead of you, because I cool mine in the morning.

The Member: When you say that you get your milk down to 70, you do not know as much about cooling milk as you ought to.

Mr. Freeman: That extra five degrees lower is not of a great deal of importance. I think my night milk is cooled to 65, and we cool our morning's milk to 70 degrees. I do not think you would have so much trouble about sanitary inspectors if you would encourage the farmers along this line.

Mr. Putnam: I would not like any man to go away from this convention with the impression that I do not fully realize the importance of adopting clean methods and keeping the milk cool. We got from different sources the very best information regarding the cooling of milk, the care of utensils, the care of stables, etc. The Department had that information compiled, and 15,000 copies were printed and distributed through the instructors and inspectors, and mailed to every factoryman in the Province. I am almost ashamed to say anything about this question after having harped so much upon it. I have stated to Mr. Barr and Mr. Publow upon different occasions, that if we devoted all our attention for one or two seasons to the improvement of the raw material, the other difficulties which we hear about would practically all disappear. I am still of that opinion. (Applause.)

Mr. R. Gleason: I heard here to-day that the man behind the cow is the important man in the situation. What I understand by the resolution before the meeting is that they want to take another step in advance, and I believe that step will not be as good or as conducive of profit to the farmer at large as the system that has been acted upon this last year. In short, I think they seek protection for the factoryman and the cheese-maker. They want us to give them a set price for the manufacture of cheese. They say we must give them an advance so that they will make a good living for themselves; that it will not be very hard for the patrons to give a little more; and they also want to protect his bounds, so that another man cannot come in and manufacture at a cheaper rate and take away this man's living. I believe that would be all right if it could be worked out after a favorable plan, but I say we should protect the farmers, too. Let us say that, in every locality where these small factories are that are only making a small amount of cheese, every man that has 100 acres of land shall keep 20 cows, and must send in 100,000 pounds of milk, and he must give $1.25 a hundred for manufacturing, then these small factories would be doing a rushing business, and a great many more could be planted in between. If you are going to protect the cheese-maker, protect the man on the other end, and make his neighbor do the same work that he does. Can you do it? If you can I think it would be complete. (Applause.) If you cannot do that then you have all the protection you need. If a man puts up a cheese factory and cannot draw trade to him he must go out of business and let somebody else take hold of it, or let a man that is further reaching than is come in and take his place. I do not see any better way. I do not think we can support a resolution that protects the cheese-maker, and says a man must take his milk to that market whether he wants to or not. We want to take our products to the best market where we get the best price, and to the man that gives us the most taffy, for we like taffy as well as anybody else.

Mr. J. N. Paget: I was very much impressed with some of the statements the last speaker made. No doubt if the conditions he has mentioned could be obtained the system would be ideal; but, I think, when he looks at the recommendation that was made by the committee, and that are now before the convention for discussion, he will look at them in a different way. I think he is looking at them somewhat partially. I think he is looking at them altogether from the standpoint of a producer, and I think he has arrived at a wrong conclusion. I do not think the cheese-maker or the owners of the factories are the men primarily to be protected under this recommendation. It is a fact that cannot be gainsaid or contradicted, that the conditions described exist to-day throughout this Province—perhaps applying to a greater extent in Eastern Ontario than the West—but, nevertheless, it is here, I think. As Mr. Putnam has said, there is a very large percentage of patrons that are doing well, and that are sending a very large quantity of milk; but there is a percentage, and in some sections a greater percentage than in others, who are not doing anything at all towards improving the quality of the milk. They are absolutely indifferent. Now, who is being affected to the greatest extent by the action of this indifferent, negligent, careless man? Is it the cheese-maker or the owner of the factory? I contend it is no such thing; it is the farmer, his neighbor who is taking good milk to the factory. (Applause.) The statement has been made, and it remains uncontradicted, that when we get in a vat of six or seven thousand pounds, two or three cans of over-ripe and tainted milk, that is going to affect not only the quality of that whole vat of milk, but it is going to affect the quantity of cheese that you get from that milk, to the extent that from six to seven thousand pounds of milk it will make a difference of from thirty-five to forty-five pounds of cheese. (Applause.) If that is a fact, who is losing by this careless man who sends a couple of hundred pounds of tainted or over-ripe milk; is it the cheese-maker? (Cries of "No.") Is it not the farmer who has been taking good care of his milk and allows this condition to exist? We ask in these recommendations that this condition be removed. Who is going to be protected by the removal of that condition? This gentleman says we are asking protection for the cheese-maker.

Mr. Gleason: Not in that line?

Mr. Paget: Those of you who know me know that I have never taken a stand behind any class. I have been endeavouring to devote my thought for the betterment of the condition generally throughout the jurisdiction of the Dairymen's Association of Western Ontario, and I believe that, if the recommendations that are now before this meeting for discussion could be brought into force and carried out, the dairy farmers of our country would be the most protected men in connection with the whole business.

There is another side to the question. I have had some information within recent weeks as to the condition in Eastern Ontario, and the same condition exists to a certain extent in Western Ontario. Some farmers are sending milk to the factory, and the cheese-maker knows it would be impossible for him to make the finest goods out of that milk; but, if he would send that milk home, the result would be, in some instances, that the farmer would take his milk to the neighboring factory, and that factory would only be too willing to receive it, and the other fellow is depending upon that patron to some extent. Therefore, he takes that milk in and says nothing about it, and the result is the whole vat of milk is injured, and the quality is injured and the quantity lessened, and I contend that the whole industry of agriculture right from the foundation up to the pinnacle is injured. (Applause.) There is only a small percentage of these men in the country, but they are here and I am heartily in sympathy with that resolution. I am not prepared to take back one act that has been thus far carried before the Department. I believe it is one of the best moves that has ever been asked for with regard to this work. I believe we must protect, and if necessary, have legislation whereby the men that are injured can be protected. If a man put his hand in your pocket and took out a dollar, the law would at once punish him, and I think we should have a law that would protect you against the man who takes a great many dollars out of your pocket by sending tainted milk to the factory.

Great Britain is our market and must continue to be, and our cheese is known as Canadian cheese regardless of what particular locality it comes from, and if inferior cheese go over there, it is rated as Canadian cheese. Some of the best cheese that ever reached the Old Country came from Canada this last year. On the other hand, some was so inferior that it has been said that they have seen poorer cheese from Canada in 1906 than they have seen in the past ten years. I hope there will be free discussion here to-day. I contend what is being asked for by the Dairymen's Association will be sustained by every dairyman that has the best interests of the dairymen at heart. (Applause.)

Mr. Gleason: I am in perfect sympathy with the system of inspection, but I think you stated an extreme case. I do not think we have any record in our neighborhood of any such change of patrons in the middle of the season, but I do not see why the patron should not have the privilege of going to the other factory if he wants to, if he starts in at the beginning of the season. The maker of the other factory might be a little related to him.

Mr. Freeland: I wonder if some of this poor cheese that we have been hearing about has not been caused by shipping it too green.

A MEMBER: I was out in Vancouver last summer, and I noticed that the Chinese had control of the distributing of vegetables, and I asked how that was. They said a white man and a Chinaman started up in business, and the white man stayed long enough in the business to put the Chinaman out. But he is no sooner gone than another Chinaman comes in, and the white man stays long enough to put that man out; but the next Chinaman finally puts the white man out. And it is the same in the cheese business. Year by year we add machinery and new factories start up within a short distance of us. That man comes in very often inexperienced, but he comes in and tells you, "I can pay more than the other fellow," and the farmers all go to him. Enough will go to spoil a route, and finally that man goes down, and then another comes in and takes his place. I have stayed against opposition now for probably ten years, and every one of these men have gone down; but I have not made any money, and I am only one of the great number. There are others in the same way, and I would like to see something done to prevent a small factory starting up against another factory. That system has brought down the name of our product in the Old Country. I think the larger the factory the better.

MR. W. ROLLINGS: With regard to the patrons changing in the middle of the season that is not an extreme case. I have suffered materially from that effect. I have been in the business for twenty-five years and I have struggled to make my business a success, and I am poverty stricken to-day. (Applause.)

A resolution that the recommendation be adopted was moved by MR. J. FLEMING, seconded by MR. W. H. KARN.

A MEMBER: I would like to know how the $12 is going to be collected from every factory in the Province?

MR. PUTNAM: I think that is answered by saying we would collect it. It would be collected just the same as a license fee. You will have to pay it if the regulation is adopted.

A MEMBER: Is it a matter of adopting the recommendation or is it a matter of legislation?

MR. PUTNAM: It is a matter of legislation. This is just a recommendation to the Department. If the Department passed a regulation whereby each factory would be taxed $12 then they would provide machinery for collecting the money.

A MEMBER: Does that mean that every factory would be compelled to engage an instructor?

MR. PUTNAM: No; but every factory would have the privilege of calling for an instructor.

MR. SMITH, Waterford: I believe the system is all right. I believe every factory should do its own testing. The cheese-makers have been instructed, and they are pretty well qualified to make cheese, and I think now the instructors should get after the other fellows that send the milk in in an improper way. I think the instructors should devote their time to testing the milk, and looking after the men who send milk not fit for cheese-making.

MR. BARR: I think the instructors throughout the Province know something about the conditions at the factory, and the conditions on the farm. I believe our methods of making cheese are as good as they are in any place in the world. The statement was made last night that we are still a long way behind English cheese made on the same system. I do not think we want to make cheese on the same system as they make it in the Old Country, where they are all made on the private farms. I believe we have in our factory system as good a method of making cheese as they have any place in the world. Our makers have adopted everything that has been recommended, and they have adopted some things they have lost money on, because they were willing to try them. I believe our cheese and butter makers have adopted every new method that has been recommended. The acidimeter came in, and I believe there are only a few factories in Western Ontario where you will not find the acidimeter. Certainly when the wire curd knife was recommended they soon had them in three-fourths of the factories.

Our methods of instruction have been running on the same way for four years, our methods of making are the same, and I tell you frankly I have nothing new to recommend next year for making cheese. Where are we going to get any change in our method of making cheese? Our best makers can make cheese as good as any instructors in this country and can make them along the same lines as any instructor would recommend. We must turn our attention to securing a better raw material. That is the point; but how are we going to get it?

In some of the factories the maker will not allow you to go out to the farmer, because, if the instructor goes out and if the neighboring factory does not employ an instructor, the patron is apt to get offended and go to the other factory the next year. The cheese-makers must stand shoulder to shoulder in the rejection of bad milk, or you will have to accept some help from the Department. I think that, if the instructors had more authority to deal with these men regardless of the maker at the factory, that there would be a marked improvement in the quality of the milk. Or if every one of the factorymen would agree not to accept milk from any patron whose milk has been rejected at another factory you could fix the whole situation in two days. Will you do it? I do not believe you will.

A Member: The people in our county have agreed to do it and we do it.

A Member: How can you educate a Canadian—by coaxing him, or driving him?

Mr. Barr: I do not believe you can drive him unless he is a poor character. We have been doing our best to educate our patrons during the last five years, and I want to say we have made splendid progress. Yet we were told last summer by a farmer that, if the maker did not like his milk the way it was going to the factory, he could do the other thing, and he would send his milk to another factory, and his milk was causing a loss of 20 or 30 lbs. of cheese a day. Just so long as our makers take in that kind of milk just so long will they get it. You will either have to stand shoulder to shoulder in rejecting bad milk, and in arranging routes or territory or give the instructors authority to deal with the patrons who refuse to make improvements.

I think we should give the instructors a little more authority and let them go to the farmers and make them do better. If a man is sending milk that causes a loss of $5 or $10 to a factory. why should we allow him to do that kind of thing.

When you coax that man or try and persuade him to do better and he says, "Get out, I will do as I like." Then I say we should take that man in some other way, and we should be able to say to him, "You will fix that milk, or you cannot send it to any factory in this country." (Applause.)

I do not care so much about the sanitary conditions at the factories, but, unless we get some more authority or more privilege in connection with dealing with a few of these men who are causing all this loss in the cheese and butter in this country, and deal with them in a different way, I claim we can scarcely do anything more in the way of education. We can keep at it, but we have enough men left who will not go to any meeting, and who will still continue to send milk to the factories to spoil the make of cheese.

At one district meeting the maker said he took particular notice of the quality of cheese he made one cool week. The next week was hot, and the week after he sent back all gassy milk, but the patrons were not cooling down the milk to 65 or 70 degrees, and during these two hot weeks his patrons lost $8 or $9 in hard cash every day compared with the week before, with the same amount of milk sent in.

I think we should take some action with regard to this matter. If you will agree to do it yourselves I will hold up both hands for it, and say you are the best lot of men in Canada; but, unless you will do it, I think the next best thing is to give our instructors who are in close touch with the work a little more authority to deal with these men, and get them to do better work. It will not affect our best men one particle. The careless man has been getting the long end of it for thirty years, and I think it is time that the good man got the long end of the business.

Mr. Boyce: Mr. Barr made some reference to sanitary inspection. He said on the platform to-day that he cared nothing about sanitary conditions at the factory. I do not quite agree with that. I believe they should be right. We know there is more tampering and adulterating of the milk at the present time than there has been in past years, and the step that is now being taken is still to get away from the testing of milk at these factories. I claim that unless the cheese-maker calls on the instructor to do the testing he will never be able to do it. There will be very few cases reported, from the fact that the maker might just as well discard that patron in the first place, because he would leave him at any rate.

As soon as the instructor becomes a sanitary inspector he will lose his influence as an instructor. I do not quite agree with Mr. Barr that we have come to our limit, because I believe there is a good deal of work to be done along these lines. If we are going to make the instructors sanitary inspectors we might just as well cut the instruction off, and call them sanitary inspectors.

Mr. Barr: I do care a very great deal for the sanitary condition of factory, because I do not want to work in a dirty factory. The sanitary conditions of the cheese factories are not all right, but I believe the material that is being delivered to our factories is causing a tremendous amount more loss than the sanitary condition of our factories, and that is why I placed the emphasis on the raw material. Has the Ontario Government got any right to pay out a lot of money to make your business honest?

A Member: Whose business is it if we take in over-ripe milk?

Mr. Barr: That is your business.

A Member: I understand we can be fined if we do that?

Mr. Barr: Under the new regulations you would be. Will you tell me how much injury has been done to this trade of cheese and butter-making by putting a little water in the milk or taking off a little cream? And yet you will find the farmers of this country will pay ten times more attention to a man who takes a little cream off, or puts in a little water, than they will to the man who is sending in tainted milk. The Government should put in motion something that would enable you to deal with these men. One test of the milk will convict any man if it is wrong; but one test is a dangerous thing to prosecute on. I will not prosecute a man on one test, and you wouldn't either, if you were in my place. What are you going to do with it? Is the instructor going to stay in the factory three days and get three tests? Is it not much easier, if you have any suspicion, that you should do some of that testing yourself, and find out if the man is tampering with the milk, and then you know when the instructor comes along that, if he finds that milk is wrong, he is not doing him an injustice if he is prosecuted. If this thing goes through, we should not have any $10 fines, we should have it $50 or six months hard labor. (Applause.) We will test the milk when a factoryman asks us to do it, and when we know we are not doing a man an injustice we will prosecute him.

Mr. Wagg: Does that tax of $12 apply to creameries as well as factories?

The Chairman: Yes.

Mr. Wagg: I have a butter factory in the northern part of the Province, and to have an instructor visit there would require a week's time, and the expenses would have to be paid by someone, and I am sure that I would not care to pay them, though I am not sure that the Department would care to pay it, and I would not feel like paying a $12 tax each year for this instruction. I believe if the sanitary inspector rigidly enforces his authority that these factories that require instruction will soon get it.

Mr. Putnam: Mr. Wagg would be dealt with especially, because he is in the northern part of Ontario and is in a special position.

Mr. Wagg: I am heartily in sympathy with these recommendations. I know the factories have been greatly benefited by these instructors' visits.

A Member: This discussion has surely been very interesting and I feel in sympathy with the recommendations asked for. The trouble is always with the poor man. Everyone who has had anything to say has spoken about the poor man that has not nice buildings. I think there should be one more clause added to that recommendation, and that in the case of those who are striving hard and keeping cows, and want to have things as nice as possible, the Government should provide money to help the poor man to pick up. (Laughter and applause.)

Mr. Boyce: We believe the farmer is going to receive the most direct benefit and would not it be the proper way for the farmer to pay this?

Mr. Putnam: Speaking as a member of that committee I believe that, if this regulation were adopted, in a year's time you would see such an improvement in the factories and creameries in the country, and in the methods of handling the milk, that you would not need half the inspectors or instructors, and that in three years' time we could cut the number in half, and, if this regulation were adopted, I believe the fee would be lessened rather than increased, because the fee of $12 would cover all the expenditure that would be found necessary.

Mr. Cornell: I am glad there are some farmers here. These Conventions are not filled up with the patrons the way I would like to see them. I am a patron and a cheese-factory owner, too, and I have noticed when the farmer gets up to speak he feels as though he were a little out of place. What are all these gatherings for? We are spending our money and what is it for? Who is going to get the benefit? The whole drift is to better the dairymen's condition.

The motion to adopt the recommendations was then put to the meeting and carried.

DAIRY COMPETITION PRIZE LIST.

	Total Score.
September White Cheese.	
1st, J. E. Stedelbauer, Fordwich	95.82
2nd, W. S. Stocks, Britton	94.82
3rd, Jno. Cuthbertson, Sebringville	94.81
4th, W. Hamilton, Listowel	94.49
September Colored Cheese.	
1st, W. Hamilton, Listowel	94.82
2nd, R. A. Thompson, Atwood	93.99
3rd, Geo. Cameron, Lyndoch	93.81
4th, Arthur Anderson, Scottsville	93.49
October White Cheese.	
1st, J. E. Stedelbauer, Fordwich	96.66
2nd, G. M. McKenzie, Ingersoll	95.66
Tie 3rd, Donald Menzies, Molesworth	95.15
Tie 3rd, Mary Morrison, Newry	95.15
October Colored Cheese.	
1st, B. A. Holland, Clear Creek	95.49
Tie 2nd, Jas. Ross, Cotswold	94.32
Tie 2nd, G. M. McKenzie, Ingersoll	94.32
4th, G. R. Stone, Curries Crossing	94.31
56 Pound Box Creamery Butter.	
1st, W. A. Bothwell, Hickson	96.82
2nd, R. A. Thompson, Atwood	95.49
3rd, E. M. Johnston, Innerkip	94.14
4th, G. M. McKenzie, Ingersoll	93.99
20 One Pound Prints, Creamery Butter.	
1st, W. A. Bothwell, Hickson	96.15
2nd, W. K. McLeod, Vanneck	94.49
3rd, G. M. McKenzie, Ingersoll	94.32
4th, Jno. Cuthbertson, Sebringville	93.99

Cheese Buyers' Trophy—For best Cheese on Exhibition.
J. E. Stedelbauer, Fordwich.

SPECIAL PRIZES.

One Case of Hansen's Rennet Extract, By The Ballantyne Dairy Supply Co.. to the Cheesemaker scoring the highest number of points on September White Cheese, J. E. Stedelbauer, Fordwich.

One Case of Hansen's Cheese Color, By C. H. Slawson & Co., to the Cheese maker scoring the highest number of points on September Colored Cheese, W. Hamilton, Listowel.

One Case of Hansen's Rennet Extract, By C. H. Slawson & Co., to the Cheesemaker securing the highest number of points on October White Cheese, J. E. Stedelbauer, Fordwich.

One Case of Hansen's Cheese Color, By The Ballantyne Dairy Supply Co., to the Cheesemaker scoring the highest number of points on October Colored Cheese, B. A. Holland, Clear Creek.

$5 in cash, By The J. B. Ford Co., to the Cheesemaker who is a regular user of Wyandotte Dairymen's Cleaner and Cleanser having the best finished cheese on exhibition, G. M. McKenzie, Ingersoll.

$5 in cash, By The J. B. Ford Co., to the Buttermaker who is a regular user of Wyandotte Dairymen's Cleaner and Cleanser having the neatest and most attractive exhibit of butter, G. M. McKenzie, Ingersoll.

The choice of a handsome gold medal, a lady's or gentleman's gold watch, and $5 in cash, total value $20, to the Buttermaker securing the highest score on butter in Class 3, colored with Alderney Butter Color, W. A. Bothwell, Hickson.

$5 in cash to the Buttermaker securing the second highest score on butter in Class 3, colored with Alderney Butter Color, R. A. Thompson, Atwood.

Mr. BARR: Mr. Stedelbauer, the man who wins the trophy to-day, is one of our youngest cheese-makers, and he was one of the cleanest men I saw last summer. (Applause.) I stepped into his factory one morning last October, and I found everything in apple-pie order. He has not got the best equipment, and that shows it is not altogether the equipment that is necessary, but this good, clean, steady work. (Applause.) He is a steady man, and a clean man, and I hope you will all see him. I am glad to see our young men coming to the front. The older men, of course, can afford to give them these prizes.

REPORT ON EXPERIMENTAL BUTTER MADE AT GLENCOE CREAMERY DURING SUMMER OF 1906.

It was considered advisable by the directors of the Association to conduct some experiments on different methods of handling cream and churning it under actual creamery conditions.

Mr. L. Smith, of Glencoe Creamery, very kindly offered us the use of his creamery for this work, and Mr. C. W. McDougall, the Creamery Instructor of the Eastern Creamery group, was placed in charge of the work, the other creamery instructors, Messrs. Dean and Hart, also spent a few days each on the work.

The object of the work was to ascertain, if possible, the keeping qualities of butter made from gathered cream handled in different ways.

The experiments made were comparing cream cooled immediately upon arrival at the creamery by running it over a Lister Cooler with the same cream pasteurized, and cream treated in the same manner and adding culture to the raw cream; pasteurized cream with or without culture; unpasteurized cream with or without culture; churning high and low testing cream; washing the butter with rolls in motion, compared with washing in ordinary way; treating cream in rather a careless manner in cooling, compared with cooling immediately upon arrival at creamery.

As it would make too lengthy a report to give the total scores on each lot we will only give the flavor of each lot. The first score in each case is the average of three scorings by Messrs. Waddell and Steinhoff in the months of August and September; the other score is the average of the judges' score at the Dairy Exhibition in London on January 16th.

The score of Messrs. Waddell and Steinhoff will be designated by W. & S., and the other score by D. E. The difference between these two scores should give a very good idea of the keeping quality of the different butters.

		W. & S.	D. E.	Difference
No. 1	Cream cooled by running over cooler	40.12	34.66	5.46
	Same cream pasteurized	41.62	35.	6.62
No. 2	Cream cooled by running over cooler, 13% culture added	38.87	34.75	4.12
	Same cream pasteurized, no culture added	40.5	36.66	3.84
No. 3	Pasteurized cream, no culture added	42.25	36.	6.25
	Same cream, 12% culture added	41.5	35.16	6.34
No. 4	Unpasteurized cream, 12% culture added	40.3	36.33	3.97
	Same cream, no culture added	41.3	37.16	4.14
No. 5	Unpasteurized cream, 15% culture added	41.33	36.66	4.67
	Same cream, no culture added	41.33	35.33	6.00
No. 6	Unpasteurized cream, 7% culture added	39.5	33.99	5.51
	Same cream pasteurized, 7% culture added	41.16	35.99	5.17
No. 7	Butter washed with rolls, overrun 21.9%	41.33	35.33	6.00
	Butter washed ordinary way, overrun 16.3%	41.83	36.16	5.67
No. 8	Butter washed with rolls, overrun 17.5%	42.16	38.5	3.66
	Butter washed ordinary way, overrun 16.9%	42.5	37.	5.50
No. 9	Butter washed with rolls, overrun 20%	42.5	35.66	6.84
	Butter washed ordinary way, overrun 14.1%	42.66	35.	7.66
No. 10	Cream thoroughly cooled Saturday evening and kept cool until Monday morning	40.16	34.16	6.00
	Same cream treated carelessly	37.66	34.66	3.00

In the experiment comparing cooling thoroughly without pasteurizing, with pasteurizing, the cooling gave slightly the better keeping butter.

No advantage in adding culture to pasteurized cream.

There is an advantage in adding culture to raw cream.

Washing the butter with rolls in motion gave a poorer quality in one case, and a better keeping butter in two cases, and in all cases gave a larger amount of butter.

The culture which was used was made from pasteurized cream. It was made in the first place from a skim milk culture, and then carried on from day to day in cream; the object was to see if a cream culture which could be made in a cream gathering creamery would improve the keeping quality of the butter.

Geo H. Barr.

MOISTURE IN BUTTER.

By Prof. R. Harcourt, O.A.C., Guelph.

This question of moisture in butter is one on which there has been a great deal of study, in which there is a great deal of diversity of opinion as to how the water or moisture may be increased or decreased by the butter-maker. I am not going to pretend to touch that side of the question at all this afternoon. I want to deal simply with results of some work that have been done on butter that was sent into us for analysis. The butter-makers will remember last spring we sent out a circular letter to all the butter factories we could get the addresses of, asking the maker to send us butter if he wished to have the moisture in it determined. We understood that a great many of the makers were anxious to try some of the methods that had been out-lined at various times for the increasing of moisture in butter. Therefore, we wrote to say if they would send to us samples of butter, and give us full details as to the nature of the cream and the method by which it was manipulated, we would determine the amount of moisture and let them know the result. We received from the butter-makers 262 samples of butter, and in all of these the moisture was determined, and in addition, in some of them the curd and salt. I cannot give you the details of all the results. I cannot give you the percentage of moisture we got under the different methods of manipulation. That part of the data is not all in my hands as yet, some of it is in the hands of the Chief Inspector. We hope, however, to get this data, and if valuable enough to put out in bulletin form we will do so. All I have to say at present of the 262 samples which were analyzed, the average percentage of moisture was 14.1. There was a range of moisture from 10.34 to 19.92. Now, of course that does not mean that the lower percentage was one that came in butter in which the man was trying to incorporate moisture, because he divided the butter he had and churned and then handled it in two different ways and then sent us two samples. So that the one would represent his ordinary way of handling the cream, and the other the way in which he was trying to incorporate the moisture, so that we have a range of 10 to 20 per cent. in the amount of moisture that was incorporated in this butter. There were only 18 samples out of 262 which overrun the 16 per cent., the legal amount allowed. With reference to the curd in these samples we found it varied from about .4 to .85 per cent., very much lower than is ordinarily given in butter. These were the determinations we got with careful work, and after proving our methods of work. The lowest salt that we found was 6 per cent., and it ranged from .6 to a little over .4 per cent.

I may say we found, in looking over the results, no relation whatever between the percentage of moisture and the percentage of curd, or between the percentage of moisture and percentage of salt. We analysed the butter sent in under the competition, and we made a determination of moisture, salt, and curd in all the 113 samples which came down to Guelph. No one of these samples reached 16 per cent.; 15.8 was the highest percentage in any of these 113, the lowest was 9.4—not so wide a range as in the other butter. The amount of curd was from .1 up to .85 per cent., the highest was about the same as was in the other butter; the amount of the salt varied from .6 up to 5.98 per cent.—practically 6 per cent. of salt. In the case of these samples we find no relation in any way between the percentage of moisture and the percentage of curd or of salt, and so far as we have been able to state it we find no relation between the percentage of moisture, and the score that was given by the judges upon that butter. It is true that the butter that has the highest percentage of moisture 15.82 per cent.) had been within .3 of the highest score, but on the other hand, we find the other samples do not correspond with it. Possibly there is a little tendency in the result to show that the butter with the higher percentage of moisture got the lower score on the third scoring, which I think was the end of three months from the time it was made. That is the result of 305 samples of butter which we analysed. I have nothing more to say with reference to these results. We hope to study out these results more in detail along with the data. Nobody seems to have had time enough to go into the details.

With reference to the determination of moisture, there are many ways in which we can determine the moisture in butter. The old standard method is by taking a certain small amount—about two grams of butter—and heating that in oven from four to six hours, or until it is constant in weight, and then determine the loss of weight, and you will have the moisture. I believe that method is accurate, but the trouble that it is slow, and nobody wanting results quickly cannot afford to wait five or six hours. It is not that it seems a large amount of time in the actual operation, but the time in which it takes to dry. Another method is by taking the same amount of butter and heating it directly over a flame, and we can get results largely duplicated within one-tenth per cent. within five minutes, but it demands a fine scale for weighing, which is not always in the hands of the ordinary butter-maker. An improvement has been brought about in that method by Prof. Patrick, of the Department of Agriculture and Bureau of Chemistry of Washington, and that is simply taking a larger quantity of butter, and using a larger dish to heat it in. That is all the difference. Instead of using two grams of butter use 20 grams of butter, and good results have been got by using as high as 50 grams of butter. The advantage of using a larger quantity of butter is simply that you can use less accurate scales. We have followed out a number of experiments, and have got results that will correspond within one-tenth per cent. That is, taking 20 grams of butter put it into a large dish and heat it directly over a flame, boiling out the water; and just the same result has been obtained if we take a small amount of butter and put it into an oven and leave it there for five or six hours. There is another method that Prof. Gray, of Iowa, has advised, of which I know nothing except what I have seen in *The Canadian Dairyman.* That method may be a great deal better than the one I have spoken of, but I do not say that it is.

I think perhaps it would be interesting if I simply make a determination of moisture in the butter according to the method I have explained of heating directly over the flame. We have been able to do that and get results inside of ten to twelve minutes. I have with me tiny scales such as we find convenient for certain lines of work in our laboratory. The advantage of this scale is that there are three beams, and you have no trouble in getting the exact weight. In this case I have got to use a glass beaker. In ordinary work we use an aluminium beaker, which is far lighter and which will stand the heat without any trouble, and it cannot be broken as readily as the glass dish. I have an alcohol lamp which I will use, but any kind of flame will do equally as well. While you are heating the butter it should be thrown up on the side of the dish so as to leave a big surface. As soon as the sizzling noise that comes with the moisture leaves and ceases, you can stop heating. [Prof. Harcourt here gave a very interesting demonstration of how to determine the moisture in butter.]

The amount of moisture in the sample I have just tested is 11.25 per cent. of moisture. That is all I have to say on the question of moisture in butter this afternoon.

I would not attempt to deal with the question of how you might incorporate the moisture. I am dealing with results of work that you have done among yourselves and we hope to get these results put into some shape so that they may be of greater use to you. With regard to this method I do not for a moment claim it is our own, and I do not claim it is a better method than Mr. Gray's. I would like to try it in conjunction with this method, and see what the result would be. (Applause.)

The Chairman: This is an ordinary sample of butter. I went around the corner and got it at the first grocery store.

RESULTS OF EXPERIMENTAL SHIPMENTS OF BUTTER TO LONDON, ENGLAND.

By Prof. H. H. Dean, O. A. C., Guelph.

My topic this afternoon is one which will enable me to give an account of some experimental shipments of butter to London, England, which we made during the past year. But before I take this up will you allow me to say a word about the work we do in the dairy department at the College. So far as I know I have never brought our work directly before the Western Dairymen's Association.

Our work in the dairy department is of a three-fold nature. First and foremost, teaching the science and practice of dairying to the students who come to us. About 150 students of the regular course take lectures and practical work on dairying through the college year. Then in our various short courses we have about 100 students who take more or less dairy work, so that we have in round numbers about 250 students every year who take lectures and practical work in the dairy department. Of course I cannot do all that work alone. I have three assistants during the year, and five or six special instructors for three months of the year.

Second, we carry on experimental work, trying to solve some of the problems that come up in connection with the dairy business. During the year 1906, we conducted 103 experiments relating to butter-making, 85 experiments relating to cheese-making, 58 experiments relating to testing of milk and cream, and 250 samples of cream and milk were sent in to us to be tested. Quite a number of cheese factory and creamery men sent samples to us to have them tested. One creamery man wrote to us that he found it a very good way to settle disputes between himself and his patrons, and that when the test was made by us the farmer or the patron seemed satisfied. I think it is a great tribute to the Agricultural College that farmers are willing, in most cases, to accept tests which we made when there was a dispute between them and the butter-maker.

About one hundred official tests were taken charge of by us for the Holstein Association. About 85 tests in duplicate were made relating to moisture in butter and cheese, work something along the line of that Prof. Harcourt has pointed out to you to-day. In all, we have conducted about 680 experiments relating to dairy work, not to mention the large amount of work which we did in connection with the milking machine, a report of which I gave at the Winter Fair.

In addition to carrying on experimental work and teaching, we carry on what may be called a dairy business. We have a creamery and cheese factory business which is in direct charge of the dairy department. For three months of the year we have a dairy school, and in that time we manufactured into butter and cheese 320,000 pounds of milk and cream that was bought from the farmers about Guelph, and cost us in round numbers $3,800. We sold the product for $4,350, or nearly $500 more than what the raw material cost us. We have the regular college students for about six months, and the remainder of the time we are carrying on experimental work. We manufactured into cheese and butter about 896,000 pounds of milk and cream. During the whole year we manufactured in round numbers 1 1/3 million pounds of milk and cream into cheese and butter. The total revenue during the year 1906 was about $17,500, of which nearly $15,000 was cash. In the year 1891, when I took charge of the dairy department at the College, the revenue from the Dairy Department was about $1,000. I mention these figures to show you how the business side of the dairy department has grown during the past sixteen years. The raw material cost us in round numbers $8,000, the products of cheese, butter, milk and cream sold for $10,600. We received for manufactured goods, after making all allowances for loss which occurred in carrying on experimental work, $2,600 more for the manufactured goods in the nine months than we paid for the raw material. Our total net expenditure in the dairy department was $2,600. We supplied to the College dairy products to the value of about $1,300. We purchased during the past year $850 worth of live stock. We assumed that it cost us to put in and operate the milking machine $500, so that if we allow for the milk and cream that was furnished to the College and not paid for in cash, and if we deduct the cost for live stock, which under ordinary circumstances would be charged to capital expenditure, and if we allowed for the milking machine and the experiments conducted therewith, the total cost of experiments in the Dairy department for the past year have been entirely paid for by the butter, cheese, milk and cream which has been sold from the Dairy department.

Why do I mention these things? You will remember that one year ago a gentleman on the platform criticised the Dairy department very strongly and practically said that the men at the College might be all right as teachers and professors, but they were no good to carry on a business. Now, I hold that these figures make a fair showing for a college professor, and you will pardon me for referring to them. (Applause.)

During the sixteen years in which we have had charge of the Dairy department, the revenue has been about $130,000, and we have lost in bad debts in round numbers $600, and I ask if there is any business man in this meeting that can show a business of over $130,000 and only have about $600 of bad debts in that time—or less than ½ of 1 per cent.?

We are of course open to fair criticism, and I think it is right that public men should be criticised in a fair manner. We do not expect that we shall have any great monument raised to us, but personally I hope to live in the hearts of the students who have been at the College, and the men whom it has been my pleasure and my great delight to meet with in the dairy business. The man who does his duty in connection with this work must of course expect a great deal of criticism.

Aristotle says, "Man is a hunter after the truth," and every man who occupies a position of this kind should be a seeker after the truth. A professor may very often differ from other people, but he must stand up and defend what he believes to be the truth. I think I may safely and fairly say that during the sixteen years I have had charge of the Dairy department I have tried to give the people what I believe to be the truth. I may have made mistakes, and I know I have, but I think you will give me credit for speaking what I conceive to be the truth with reference to the dairy business. (Applause.)

That brings me to the consideration of the topic for the afternoon, and I shall be as brief as I can. In the first place I should like to say we are under a debt of gratitude to Messrs. Hodgson Bros., of Montreal, and Rowson and Hodgson Bros., of London, England, for the great interest they took in this special series of experiments.

I shall divide my subject into seven parts:

1. We compared sweet cream without culture, sweet cream with culture or starter, and ripened cream, conducting altogether 45 experiments.
2. We compared salt and various kinds of commercial preservatives as a means of preserving butter until it reached the market in London, England. We applied these preservatives in both dry and liquid forms in order to compare the relative values of putting in preservatives in a dry form and applying them in the liquid form or dissolved in water.
3. We compared ordinary boxed butter with putting similar butter up in pound prints, and these were enclosed in a special carton we had made for that purpose.
4. We compared cream, delivered in the ordinary cream gathering way and made into butter, with butter made from whole milk.
5. We compared the export and home markets as to financial returns.
6. We tried to get some data on the transportation with reference to getting better facilities.
7. My seventh point is a summary of the whole question.

In a word the highest scoring butter was made from sweet cream without any culture or starter, run directly from the cooler into the churn, and churned immediately we were done separating, pasteurizing and cooling. Will you allow me to say that in my judgment the day is fast going by when the butter-maker of this country can afford to sour the cream as he has been doing in the past, developing a foreign flavor, and getting an acid taste in our fine quality of butter. As a result of careful experiment I feel convinced of the fact that it is possible to make the finest quality of butter without using any starter, or culture, or souring or ripening the cream in any way whatever. I feel satisfied it can be done if you have the proper appliances for doing it. Do not run away with the idea that I am advising you to do that in a general way next year. I would advise you in all cases of this kind to go slowly. Understand the whole situation before you make any radical changes in your method, but if you have the opportunity of testing this matter, I would like to have you do so, and then send the butter to some of your best customers. Some of our customers say they never tasted butter like that. The girls and teachers at the Macdonald Institute, and I suppose they are as critical a lot as you would find anywhere, have come to me and said they never knew what a fine flavor of butter was until they ate this butter. I think we have educated the people generally up to a false standard with reference to a fine quality of butter.

We found that there was little or no difference in the quality of the butter when it reached Montreal, and when it reached London, whether we used ordinary common borax, which you can buy for 5 or 6 cents a pound, or whether we used some commercial preservatives that cost 10, 12, and 15 cents a pound; and I am satisfied from the work we have done that it is wholly unnecessary for us to pay 15 cents a pound for preservatives, assuming that you feel the need of such, when you can get just as good preservatives for 5 or 6 cents. That is not an opinion; it is the result of practical experiment tested in previous years in our own refrigerator, and this last year shipping the butter to Montreal, and having it scored there, and then to London, England, and having it examined there. The judges did not know what was in the packages; they were simply numbered so and so. It was important that they should not know what kind of preservative was in them, or whether they were made from sweet cream, pasteurized or unpasteurized. We found that prints made August 4th, 8th and 9th from sweet cream from culture, and from ripened cream washed with brine and borax, wrapped in a special carton and shipped August 12th from Guelph, sent to London, Eng., were in more or less rancid condition when they reached London. The report we got was: "They had a tendency to sidiness." I fancy they meant the butter had gone off flavor on the outside. It seems that it is not possible for us to make butter and ship it to London, England, in print form, and have it reach there in good condition. Another objection is that, as a rule, they prefer to make their own prints, and they do not care to handle print butter of some other brand.

We found also that butter made from cream delivered by average farmers—and I think I am safe in saying that about Guelph we have an average class of farmers, no better and no worse than are to be found around any ordinary creamery or cheese factory; some of whom have separators and some use deep cans—was equal to butter made from whole milk. This cream was pasteurized, cooled and churned, and made into butter, packed in 56 pound boxes, and compared with butter made from whole milk cream made in the same way. When scored in Montreal and when scored in London, England, they were given practically the same score; or in other words the butter was as good made from cream delivered by our patrons as butter made separated from whole milk. That indicates that it is possible to make good butter in either way. I think these samples scored about 98 to 99 points. You will find these details in our annual report, and it shows that it is possible to make a fine quality of butter on the cream-gathering system.

As to the financial returns: In every shipment there were from three to fifteen different kinds of butter, and the number of boxes were from eleven to twenty-two, making in all 8,128 pounds of butter, or 903 pounds of butter per shipment. We received for these 8,128 pounds of butter $1,-645.70, or an average of 20.2 cents per pound. On our home market we sold no butter last year for less than 21 cents per pound. I mention this point to show you the relative difference in returns from our home and export markets. I would have you bear in mind that there were special charges on these experimental shipments, and that it was not possible to have the lots uniform. Bearing all these points in mind we consider an average of 20.2 cents per pound a very good price.

They sold in London as follows: June, 106 to 108; July, 110 to 112; August, 114 to 116 shillings per hundred weight.

A word about transportation. Very often the butter-makers are at fault in their methods of caring for the butter, and perhaps are scolded justly because the butter reaches Montreal at too high a temperature. On three different occasions I went down to Guelph to meet what is called the "way-freight," which is the only freight train going through Guelph carrying refrigerator cars, and three different times I was unsuccessful in meeting that train. It was supposed to be in Guelph at nine in the morning. They usually come out for our butter between eight and nine in the morning. I went down on July 6th, when I had been told the train would reach Guelph at eleven forty-five, and I inquired from the man when the train would be in, and he said it left Berlin half an hour ago and will be in in a few minutes. I sat down and waited and waited till half past twelve came, and there was no sign of the way-freight. I went to one of the men and I said, "Where is the way-freight?" and he said, "She has not left Berlin yet." I went to the agent and said, "How is this? I came down to meet this train, and I was told it had left Berlin, and now after waiting here nearly an hour I am told it has not left Berlin." I went out and took the temperature in the freight shed, and it was 74 degrees, and that is where our butter had been since nine o'clock in the morning. I stood around there and kept inquiring about that freight. Then I went home. On August the 10th I went down with the butter. In the meantime I had written to the head agent in Montreal very strongly. Soon after a number of officials called at the dairy to explain that it was difficult to control the way-freight, but they would try and let me know when the way-freight would be in. In order to help matters we began shipping our butter over the C. P. R. However, I went down on August the 10th and took the temperature of the air outside, and it was 76 degrees. The temperature in the west end of the car was 70 degrees, at the door 70 degrees, and at the east end 68 degrees, and this was supposed to be a refrigerator car.

Mr. RUDDICK: How did you take the temperature?

Prof. DEAN: With a thermometer.

Mr. RUDDICK: You opened the door first?

Prof. DEAN: I climbed right into the car as soon as the door was opened. I got off the waggon that contained the butter boxes, opened the door and took the temperature, because as soon as they loaded the butter the train went away.

Another thing I found in that car was that they had store butter in tubs, and the covers had been knocked off them, and there was butter all around the car and when they took our butter off the dray they put it on top of those dirty tubs, and I said to the man, "Why not put that butter at the end of the car?" and he said, "I have not time. I have got to pull right out."

I hold there is something wrong in our methods of transporting butter, and I think you will find that in some cases at least that it has not been the fault of the butter-maker that his butter reached Montreal at too high a temperature.

To sum up the whole question: 1st, sweet pasteurized cream churned in less time than ripened cream and at a lower temperature. A great many people have the idea that in churning sweet cream you have to churn a long time, but that is not our experience.

2nd. The average per cent. of moisture was 13.789, the lowest 13.510. Saltless butter scored higher in nearly every case. I wrote to find out the explanation of that, and the firm in London said that they thought the butter had a flavor due to the salt, showing that it is important that the butter-makers should use pure sale or there is danger in tainting the butter. There was little difference in the butter from sweet and ripened cream, what difference there was being in favor of sweet cream butter.

3rd. There was little or no difference between the results got by using borax and the various commercial preservatives.

4th. The gathered cream butter in the experiments was equal in quality to the whole milk butter.

5th. The pound prints were not satisfactory.

6th. The financial returns were good, but hardly equal to those obtained in our local markets, but we must bear in mind that the export trade makes a suitable outlet for all our surplus butter.

I have tried to bring before you the result of these experiments in the briefest way possible, and I trust I have made them plain to you. (Applause.)

COLD STORAGE AND TRANSPORTATION FOR BUTTER.

By J. A. Ruddick, Dominion Dairy Commissioner, Ottawa.

I can assure you that it would be strange to me to be absent from this Convention, because I think I have attended all your conventions for the last twenty years, except when I was out of the country, and it does not seem at all strange to me to come up to this part of the country, because as some of you know I am pretty nearly home. I was born within sixteen miles of this city.

I have listened with a great deal of interest to what Prof. Dean told you about shipments of butter to Great Britain, and I shall refer to the refrigerator car service.

I do not assume any responsibility for the running of refrigerator cars. There are many things which we are not in a position to deal with. The Government guarantees the running of cars over certain routes, but shippers want to put the whole responsibility of looking after the shipments upon the Government. The Government and its officers are willing to do all they can to improve the service, but there are some things they cannot do nearly as well as shippers.

There is no more important question for the butter-maker to consider than the cold storage, and I am glad to say there has been a marked improvement. Any information which we are able to collect from time to time proved that there is a very decided improvement in cold storage in connection with creameries throughout the country. I think probably more improvement has been made in some of the dairies in Quebec, and I do not intend to deal with that side of the question at any length, because I deal with that matter in my annual report, and any person requiring information on the subject can always secure a copy of the report. The plans cover two different systems, the one system which is known as the "Cylinder" system in which ice and salt are placed in the cylinder. There is another system known as the "Air Circulation" system which we recommend. The cylinder system is very much cheaper to install; where you have an air circulation system the ice chamber as well as the cold storage room requires to be thoroughly insulated. While the circulation system costs more to instal, it is the cheapest to operate, and there is this much to be said in connection with it, that we get the lowest average temperature with the circulation system. Where the cylinder system is used the cylinders have to be kept full all the time, and they use a considerable quantity of salt. On the whole the air system seems to give the best satisfaction, and I recommend that system. I had a few figures taken from the Inspector's report before I came away yesterday.

We know that the refrigerator cars are not supposed to carry anything but butter. Cheese is not allowed in them, because it is always delivered at a high temperature, and it would be injurious to the butter to have the cheese in the car, because it would be impossible to keep down the temperature of the car.

Butter may be divided into two classes. During the past year our instructor was travelling through this western part of Ontario to discriminate and make notation and report as to whether butter was dairy butter or creamery butter. In subsidizing this service the Government had no desire to discriminate against dairy butter, but we find that in going over the temperature that there is a very marked discrepancy between the temperature of creamery butter and dairy butter. I have records from some twenty creameries, and I find the lowest temperature of butter recorded is 32 degrees, and the highest temperature 54 degrees. That gives an average of about 49 degrees. The temperature of dairy butter varies from 59 to 74 degrees, an average of over 66 degrees. It is a question in my mind whether this dairy butter should be allowed in the cars, or whether butter at a high temperature should be allowed to be put in the cars. It seems to me it is just about as injurious to the creamery butter which has been properly chilled as it would be to have cheese loaded into the same car, because the temperature of the dairy butter is nearly as high as the temperature of the cheese. The country merchant who collects large quantities of butter should provide himself with cold storage, and I think it is just as important that this dairy butter should be chilled as it is that the creamery butter should be chilled. I am not so sure but that it would be a wise thing to limit the use of these refrigerator cars to butter properly chilled before it is delivered to the station. If the merchant who handles butter would provide cold storage, dairy butter would not have the bad name that it has in the market at the present time. While farmers might think it was discriminating against them, I believe such a measure would be very much in the interests of those manufacturing dairy butter. I have some figures here showing the average temperature throughout the section of the country, and also the temperature of the cars when they arrive in Montreal. We never tried to take the temperature of the car by opening the door and putting a thermometer inside, because the warm air would get in with the thermometer. None of our records show the temperature of the air in the car because we recognize that you cannot open the door of a refrigerator car without changing the air. It is impossible to get an accurate record of the temperature in that way. We take the temperature by putting the thermometer into the butter about three inches and in that way we got a fair average temperature, and we also take the temperature of as large a number of packages as possible, and in making a comparison of temperature at shipping point and Montreal we take the temperature of exactly the same packages. We find that the average temperature of butter delivered at the station of the C. P. R. in Ontario was 57.7 degrees; that was the average of 21 tests. An average of 106 tests on the G. T. R. gave 56.9 degrees. This same butter on arrival at Montreal was 4 degrees colder, so that the refrigerator cars chilled the butter 4 degrees en route from here to Montreal. These are the average tests of the butter contained in the cars. There was a considerable quantity of very warm dairy butter placed in the cars. The temperature in the Eastern township was somewhat lower. On the north shore in Quebec the temperature was 58 degrees. I have in my hand several thermographic records. That is a photograph of the original record taken on a car from Windsor on August 25th. The temperature in that car varied from 54 to 46 degrees from Windsor to Montreal. By the use of the thermograph we have been able to determine whether delays have occurred.

Q.—Was that the G. T. R. or the C. P. R.?

A.—The C. P. R. When the car is in motion this thing is so delicate that it vibrates a great deal and makes a white blurred line, and when the car is standing still that ceases and we found where some freight cars were standing for twenty-four hours on the way from St. Catharines to Winnipeg. Coming back to this particular butter car from Windsor, it shows the length of time the car was on the way and the average temperature was from 54 to 46 degrees. I have a great deal of information on this subject, and I still think that the weakest link in the chain of handling butter is at the creamery and from the creamery to the station. I appreciate the difficulties Prof. Dean speaks of in not being able to know exactly when the car would arrive at the station. I have been doing my best to point out to the railway officials the necessity of having their cars operated on a more definite time-table in some way, and I hope we will be able still to have improvement made in this direction. I have always found that where I can give the higher officials on the road instances of neglect they are only too glad to try and correct things. We have found that a great deal of education in connection with the railway employees is necessary in this work, and for that reason we have had men travel over the refrigerator car routes and visit the agents and find out what they know about these cars, and we have found that they do not know very much. I do not know any class of men that seem to take less interest in their work. They get through their work with just as little effort as they possibly can. When our agent arrived at some stations, they did not know anything about refrigerator cars, and had not even received a circular. We have been able to effect some improvement by impressing on the station agents the importance of giving this butter special attention to prevent, as far as possible, unnecessary exposure. On these long runs it is difficult to arrange the way freight so that it will run exactly on time. You never can tell how much freight will have to be handled. Some days there is a large quantity and other days less; of course the iced butter cars must travel by the way-freight. It could not be placed on the other freights because these trains do not stop at every station. In arranging these different routes for iced butter cars we try as far as possible to meet the wishes of the shippers, having in mind all the time what will be for the best interests of the trade. I find after the circular has been issued it is difficult to change the system, and if anyone has any suggestions to make as to the movements of these cars we would like the information at once, not later than the first of March, because by that time we take this matter up, and it usually takes a month getting it arranged. Last year I sent out circulars over the country for the purpose of getting information. We try to comply with the wishes of shippers as far as possible.

Another point I want to refer to is the day of the week on which the cars start from the western points. Monday has been objected to as a bad day for creamery men and the railway companies claim it is difficult to have the cars properly iced on Monday morning. If the car does not get started till Tuesday it cannot get in Montreal in time to catch that week's steamer. One man wrote to me and said he found that the butter arrived at Montreal on such a day, that it had to be taken out from the car and put in cold storage to keep it until the ship sailed, and I think it should be done with all butter. The time is coming when no butter will be received by steamship companies unless at a proper cold storage temperature. The chamber on a ship is not like a cold storage warehouse; there is no reserve of cooling power there. The whole space is filled at one time and if the temperature of the goods is high it is impossible to have machinery that will cool that and keep that temperature down properly from the beginning. That is why you have some records of temperature across the ocean that gradually reduce. That is unfair to the man who puts his butter into cold storage at Montreal. The butter must be delivered to the steamship company at a low temperature.

I have a record of temperature across the ocean. May the 13th the temperature started in at 22 degrees and was reduced to 15 degrees before it reached the other side. The variation was from 22 to 15, and I consider that a very satisfactory temperature for the carriage of butter over the ocean. I believe the most efficient link of handling our butter is on the ocean from the warehouse at Montreal, where they can command any temperature they desire. I am speaking of the transportation of the produce.

You have heard a good deal about the facilities in Great Britain for handling butter and cheese as delivered on the quays. I had the opportunity of making a personal investigation a year ago last summer. So far as London is concerned the facilities are first-class. I doubt if dairy produce, butter and cheese and that sort of thing, are handled better at any other place in the world than they are in the docks where the bulk of Canadian produce is discharged in London to-day. The warehouse is one of the most complete that I have ever seen. The ocean rate includes handling and storing the produce in this warehouse before being delivered. During the last two years these facilities have been there the London trade has increased considerably, and other places have shown a corresponding decrease, and that very fact is having a very important effect on the authorities of other ports who are looking forward to provide similar facilities. At the port of Bristol they are building one of the finest docks in Great Britain. They are spending $30,000,000. They have good cold storage facilities, and are handling a good deal of butter directly into iced vans, and I believe they are the only iced vans in England. Some delay often occurs in lifting the goods from the railway sheds in Bristol, and it is not as good as it might be in that respect. In Glasgow they have no cold storage factories, and the Scotchmen are not enthusiastic over cold storage. In fact, one importer ordered his butter to be shipped in ordinary cargo, and there are merchants in Glasgow to-day that will tell you that it does not do the butter any good to put it in cold storage. I think it is at Liverpool that we as Canadians have the most fault to find with the way in which our produce is handled. I am glad to say there is a fair prospect of some improvement being made on the port of Liverpool. The whole of the Mersey is controlled by the Mersey Docks and Harbor Board. No warehouse can be erected without their consent. They will not allow outside corporations to erect anything on their property. It is a very great corporation, and it is a very honorable position to be a member of the Mersey Docks and Harbor Board, but I think they are a little slow in moving. They did not like it very well when I told them that we should have better facilities.

I would like to have the co-operation of all the shippers in arranging as soon as possible satisfactory services, and I shall be glad if you will send to me at any time any specific complaint as to the order of services. We do not accept any responsibility for the operation of the cars, but we are willing to send on any complaint to the proper authorities. Last year there was a clause in the agreement that if a car arrived at Montreal without ice no subsidy should be paid, and we found that the cars were better iced last year than before. A refrigerator will get warmer than an ordinary boxcar if they have no ice, and if they are fairly filled with ice you can depend on the temperature being 50 degrees. The lowest temperature I have ever seen in a refrigrator car was 48 degrees. The car came from Calgary; of course the longer the route the lower the temperature.

Mr. Smith, Alton: Is the butter taken from the car to the ships on the ordinary drays, or have they iced wagons?

A.—It is all carted to the warehouse and carted to the ships, and that is one of the weak points of our facilities at Montreal. I do not know that they will ever be able to overcome them. There is a proposition to have cold storage on the wharves so that the goods can be discharged from the cars into the cold storage.

Mr. Smith: I am very pleased that there is a movement being made to get cold storage on the docks, because sometimes a car might leave here and it would not get in in time for the boat.

Mr. Ruddick: I think it takes longer for the cars to go than most people imagine.

A Member: Which do you find is the drier, the air circulation or the cylinder system?

Mr. Ruddick: We find the air circulation is drier.

A Member: Consequently there is less trouble from mould?

Mr. Ruddick: I should say on general principles the drier the cold storage the less danger from mould. There has been a good deal of trouble with our butter moulding, and I think a good deal of the trouble originated at the cold storage at the creameries; they are not always as well kept as they should be; they very often become mouldy. I am satisfied there is nothing will pay the creamery man better than to thoroughly disinfect the inside of his cold storage once a year. I mean to thoroughly wash it with some strong germicide like bichloride of mercury, and thoroughly scrub the whole inside of the creamery cold storage. I had the sheeting taken off the ice chamber at Brockville, and I was very much surprised that there was not the least sign of rot, and I think it was because we have always washed the walls with this solution once a year. If we could get a larger number of our creameries to adopt some such treatment as that there would be very much less trouble with mouldy butter. If you use boxes made from unseasoned wood you are apt to have mould.

A Member: Would whitewash do?

Mr. **Ruddick**: It is a good disinfectant, though of course that is not as powerful as this is.

Mr. **McLeod**: Would it do to put up racks, and put blocks of ice on them instead of using this solution?

Mr. **Ruddick**: No, you would get very poor ventilation, because with the blocks of ice alone you do not get a very low temperature, and you have the place reeking with moisture, and you have not got a proper circulation of air. The workmanship you get in these buildings counts for very much. When I built these four buildings for the Government there was no difference in the plans, but there was a difference in the buildings, because one contractor had to be watched all the time. He tried to put in poor paper, and he would not use good lumber, and the other one wanted to do a good job. If you are building a cold storage you want to pay attention to it yourself, because the average carpenter does not pay attention to it.

Mr. **McLeod**: Does the Government continue the bonus for cold storage at creameries?

Mr. **Ruddick**: It has not been approved of by this Parliament for another year, but I have no doubt it will be; if you make application before the first of April I should say you would get the necessary forms of application.

ELECTION OF OFFICERS.

The report of the Nominating Committee was received and adopted. See page 5.

INTRODUCTION OF THE NEW PRESIDENT.

President **Ballantyne**: It is my pleasant duty this evening to introduce to you the President-elect of the Dairymens' Association of Western Ontario, Mr. John McQuaker, of Owen Sound. He was elected this afternoon President for the coming year, and I am certain you have made a good choice. Mr. McQuaker has been one of our most valuable members, and he has always taken a deep interest in everything coming forward in connection with the Association. He not only takes a deep interest in dairy matters, but he also takes considerable interest in municipal matters. At the last election in Owen Sound he was elected at the head of the poll as town councillor, and was chosen chairman of the finance committee in that city. He runs a very large creamery, and you can see his interests are very much with the dairymen. I have now a great deal of pleasure in introducing to you Mr. John McQuaker, and he will take the chair for this evening.

Mr. **John McQuaker**: I can assure you it is with pleasure I accept the honor you have done me in electing me as successor to Mr. Ballantyne. The Ballantynes always lead, and where they lead I am perfectly safe in following. They have always been recognized as leaders in the dairy industry in Canada, and I hope they always will be. I come from away up in the north, where we have no cheese factories. I have been a representative of the butter side of the industry, and it is now the turn of the butter people to have the highest office in your gift. Although my chief interest is in the manufacture of butter,I may say we are quite large consumers of cheese. In a retail business with which I am connected we handle a good many cheese during the year. I think I am safe in referring to the Board of Directors with whom I have been connected for the last few years. I think they will say I have never on any occasion sought to put forward the butter end of the question at the expense of the cheese end, nor shall I ever attempt to do so. I quite readily recognize that the cheese industry is the larger one of the two so far as Western Ontario is concerned, and I shall always be ready in conjunction with the other members of the Board to seek to further the interests of the cheese as well as the butter end of the industry.

My appointment was made only an hour or so ago, and I did not think of making any address to night, because we have men here on your programme who will interest and instruct you, and I shall not keep you listening to me. I may have something to say as we go along. I trust that we, as a Board, and as members of the Western Dairymen's Association, will be able to work together during the year 1907 to make the work as successful as possible. This convention has already mapped out a very considerable amount of work for the Board of Directors, and I am satisfied that they will take it up and carry it out to the best of their ability. (Applause.)

SOME LESSONS FROM THE COOL CURING OF CHEESE.

By J. A. Ruddick, Dairy Commissioner for Canada, Ottawa.

I fancy that the interest in this question of cool curing of cheese is centered now more in the direction of cool curing-rooms and the management of the same than in any other phase of the question. I may say, however, that the experience which we have had in that line of work has convinced us that all our previous exertions were fully justified, and the more experience we have had with the cool curing of cheese the more convinced we are that it is of very great importance to the cheese industry of this country. It has been rather slow work making an impression on the trade in Great Britain. One of the reasons for that has been that the shipments of cheese have been small and more or less isolated, so that it very rarely happens that an exporter has sufficiently large quantities to fill up any particular order.

[See Report of the Eastern Dairymen's Association for first part of Mr. Ruddick's address.]

Just a word or two on the construction of cool curing rooms. Any of you who are looking for information I would refer to my annual report, which contains full plans and specifications, and I would like to say that since that report was published I have been making some investigation with regard to damp proof surfaces, which have to be exposed to moisture, like the melting of ice, or where it is desirable to keep the air in the room as dry as possible, and I have been quite recently successful in getting some very effective materials. I find it is quite possible to cover the interior of a wooden ice chamber, with what is known as metal lath. Nail that on the wood surface, cover it with a thin plaster of cement, and then paint it over with water proof paint. They will guarantee an absolutely water proof surface, and if that can be done with the ice chambers in connection with cool curing-rooms, or in connection with the creamery cold storage, it will add a great deal to the permanence and to the sanitary properties of these rooms or buildings, and it is a thing which I think is well worth looking into on the part of those who may be interested in this question.

One of the greatest problems of all cold storage work is to provide a damp-proof surface. When I say damp-proof, I do not simply mean a cement surface or material to prevent water from pouring through. We have to go a good deal further than that. You know a cement wall or a cement floor would be quite water proof, in the sense that it would not allow water to pour through, but it is not by any means damp-proof. It is practically impossible to make a cement structure damp-proof; a certain amount of moisture will be absorbed and given off.

I referred this afternoon to the fact that I had made some examinations of the ice chambers that have been used five years in Brockville. The sheeting was wood, and I had it taken off, and I was surprised to find it had not deteriorated to any extent. Although the first course of lumber was damp, there were not any signs of dampness beyond that, and no deterioration, and I believe that was due almost entirely to the fact that these walls were thoroughly disinfected every year; and I would like to emphasize that point. I am a strong advocate of having a temperature of about 60 degrees—not allowing it to go over 60 degrees—and the reason I find that temperature is most suitable is because we find the best flavors develop in the cheese at about that temperature. It is very important that the cheese should be properly cured so as to encourage consumption of the article, and I want to make a strong protest against sending cheese that are not properly cured to the British market. If you do that you will check the consumption of cheese just as sure as night follows day, and if you are going to protect your business you must be very careful on this point.

The Chairman: I am sure Mr. Ruddick was extremely interesting on this question. He has given you something to think about. This afternoon he was taken to task for not providing proper transportation, and I would like to say for Mr. Ruddick's encouragement that he may possibly remember that last spring he wrote me asking if I had any suggestions to offer as to the car service from Owen Sound, and I wrote asking that he secure for us a weekly service instead of a bi-monthly service, and after a very short time had elapsed I had word from Mr. Ruddick that he had secured that arrangement, and I want to say that the service was entirely satisfactory during the whole summer. We used the car almost every week, and we had no difficulty whatever; being at the end of the route the way freight always started at the right time, and the car always went away iced, and we always put our goods in it ourselves. We put them in the proper place and in the proper way, and we had no difficulty. Of course ours was with the Canadian Pacific Railway, and that may make some difference. We had hoped to have with us to-night Mr. R. M. Ballantyne, of Montreal, but owing to the fact that that gentleman has met with an accident it is impossible for him to come. We also hoped that our friend A. F. MacLaren, M.P., of Stratford, who is almost inseparable from our Dairy Convention, would be with us to-night to present this handsome trophy, but Mr. MacLaren wired Mr. Ballantyne to-day as follows: "Sorry important business and poor health will prevent my attendance. Hope you will have pleasant, profitable, and successful Convention. Kind regards. Happy and prosperous new year to all." (Applause.) We have with us one of the men who is amongst the early secretaries, if not indeed the first secretary of the Western Dairymen's Association, Mr. J. C. Hegler, of Ingersoll, who will speak to you and select his time for presenting this handsome trophy to Mr. Stedelbauer, who I will ask to take a seat on the platform. (Applause.)

Mr. Hegler opened up his remarks with some interesting stories, and got the audience in a jolly good humor. He then proceeded to say: There is no doubt a great deal is to be learnt still in the manufacturing of cheese and in the curing and marketing of it, and when the people begin to realize the great importance this industry has attained they ought to take advantage of gatherings such as these, and of everything that the Government of the country is doing for the purpose of encouraging the education of the masses. You cannot stop at the cheese-maker; it is not his fault that he gets poor material which he cannot make good stuff out of. The knowledge has to be disseminated down to the patrons, and that is the fountain head of the whole thing. If the patrons would take care of the milk I am sure you would find better results.

Let me give you a little illustration. As you all know there is a large condensing factory at Ingersoll, called the St. Charles Condensing Factory, where they manufacture condensed and evaporated cream. They have a very large patronage. They draw milk from the whole surrounding country, and to some extent they have interfered with the cheese factories in the neighborhood. The patrons say they get more for the milk, and those that do not get their milk into the condensing factory say they are not losing so much because they say the men who send milk to the condensing factories have to take so much better care of their milk. The condensing factory send out an inspector to the farms who inspects the utensils, in which the milk is sent to the factory; the barns and stables, and the cattle and the system of caring for the milk, and every precaution is taken to get pure milk. I think I am safe in saying that it is utterly impossible to make good cheese out of impure milk, and if you take the same precaution about the milk you send to the cheese factory that they do with the milk that is sent to the condensing factory you would have far better results. A farmer came to me and said he had notice from the condensing factory that they would not take his milk any more, and I inquired into it, and I found that his hired man was careless about the stable. He turned the cows into a dirty stable and did not properly clean them, and the result of it was he had to get rid of that man; and having done that and having improved the situation, he succeeded in getting his milk into the factory again.

The farmers of this country are in a better condition than any other class of people. In the olden times if a farmer wanted to borrow $100 he had to pay 8 or 9 per cent., before he got it he had to get down on his knees to the banker and get two or three neighbors to indorse the note. Now, what is the result? The farmers are the men who are the depositors. and if a farmer goes into a bank now he can get all the money he wants at a low rate of interest without any security, and the bankers are taking off their hats to the farmers instead of the farmers taking off their hats to the bankers. All this has been brought about by increased interest in the dairying industry. There is no farmer in Canada but has everything he wants. His family is looked after, and he has a handsomely built house, splendidly furnished. They send their daughters to college, and their sons can be educated in the billiard room if they want to, and there is not a young man on a farm but has his rubber tired buggy and a high stepping horse. Why, some of these farmers are getting their automobiles, and we poor duffers in town will have to look out or we will get run over by them. (Laughter and applause.) They have telephones all over the country, and this great improvement in the agriculture classes has been brought about largely by similar institutions to the one that is meeting here at the present time. (Applause.) The Chairman has kindly asked me to present this trophy to Mr. Stedelbauer. This is a challenge cup presented to the most successful manufacturer of cheese, and it is presented by the cheese buyers of this district. It is valued at $150, and becomes the property of the man who wins it three times, or who wins it two years in succession. It has never yet become the absolute property of anyone, and that is right. I would like to see it go around. Mr. J. E. Stedelbauer is the fortunate winner, and I am sure it gives me a great deal of pleasure to present you, Mr. Stedelbauer, with this trophy, and I am sure if you were to tell the truth about it you would say that the success which you have arrived at in the manufacturing of cheese which has enabled you to win this trophy is largely due to the knowledge which has been gained at these conventions, and the instruction that you have received through conventions such as this. It is certainly a thing to be proud of.

Mr. J. E. Stedelbauer: I am sure I am very proud to have the honor of winning this trophy, and I thank the cheese buyers of Western Ontario for it, and I will do my best next season to make every cheese just as good as the one that enabled me to win this handsome trophy. (Applause.)

A Member: I am somewhat interested in the cheese industry, and I would like to ask Mr. Ruddick how long from the time the cheese leaves here before it gets to the consumer in the old country?

Mr. Ruddick: That time varies a great deal, but during the early part of the season a great deal of the cheese goes direct from here to the consumer.

A Member: It is a question of supply and demand.

Mr: Ruddick: That is beside the question I was discussing. It is a question of giving the people something that suits their taste.

A Member: I was at a farmers' institute meeting the other evening, and there was a gentlemen there that stated they had got reports from the Old Country that a small part of our cheese brought nearly the price of the Cheddar cheese of the Old Country, but a great part of it brought a considerably low price, and the reason was because the cheese we shipped was too green. Now I understand the Ontario Government is going to pass measures directing the factorymen as to how they should fix up their factories, and are telling the cheese-makers what they should do in oredr to make the cheese right, and that being the case I think they should also say when the buyer will get that cheese. I believe we are killing the goose that lays the golden egg by shipping that cheese too early. I do not think it is the fault of the salesman in the factory or the cheese-maker, but I think it is the fault of the man who buys that cheese and puts it on the British market. If there was legislation that the cheese would not be sold, and if the buyer had to put it in cold storage until thoroughly cured, and send it to the Old Country, it would be a great deal better.

Mr. Ruddick: I would like to take issue with that view of the case, because by that we are throwing the blame on somebody else. This cheese business is your business. It does not belong to the buyers, and why should we not run our own business.

A Member: I am only a farmer.

Mr. Ruddick: You are exactly in the same position. You have an interest in the cheese business. The cheese buyers will look out for themselves. I do not think your idea is the right one. I think you should take the view that it is your business, and that you should run it and not allow an outsider to run it, because I consider a cheese buyer is an outsider. He is not interested in your end of the business. It does not make any difference to the average cheese buyer whether the cheese business goes to smash or not, but what are the farmers going to do if the cheese business goes to smash. Now I wish you would take hold of this question, and not depend on someone else to conduct your business for you. I may be wrong, but I said I do consider the cheese buyer is to blame for encouraging it, but the responsibility goes back to the people to whom the business belongs, and who are going to suffer if it is affected.

A MEMBER: The Government says I shall put that milk into the factory in such shape; that the cheese-maker shall put it in such shape to make cheese, and the factory must be in such a shape; and now I want to say if that is going to take place, why not put that cheese on the market when it is in the best possible shape. I am not in a position to stop that thing.

The CHAIRMAN: If salesmen refuse to sell it that will stop it.

DAIRY DEVELOPMENT.

BY C. C. JAMES, DEPUTY MINISTER OF AGRICULTURE, TORONTO.

Colonel Hegler has been telling us about the prosperity of the farmers and the dairymen. Perhaps some of you think he was exaggerating. A good many of us know he was not exaggerating. He was simply stating a bald and pleasant truth. A short time ago the announcement was made in the Toronto papers that the headquarters of a British Loan Association were to be moved from the Province of Ontario to Manitoba, and the reason given by the manager was that he could no longer do business with the farmers of this Province. The farmers were becoming so well to do, and they had so much money in the bank that there was very little loaning to be done, and they had to seek new quarters, and were going off to Manitoba and the North-west.

I could take you to a small section in the eastern part of Ontario, and if you had gone there ten years ago you would have found very few cheese factories, and the farming business of that community was in a rather down-hearted condition. Hard times of the worst kind were being felt; but the dairy industry came in and began growing and growing, and a few years ago they formed a cheese board in one of the near-by towns, and the sales of cheese on that cheese board this past year aggregated no less an amount than $700,000. Just picture to yourself what the effect of that has been. Here is a little community surrounding a small town, and in one year $700,000 in cash is brought in from the sale of only one line of produce, although of course that is the main produce of that district. In addition to that there are other lines of production, but that one line brought into that one town, and distributed throughout the community surrounding it, the sum of no less than $700,000. A man who had visited that town ten years ago recently went back there on business in connection with our Department, and he told us on his return the change that had taken place there was simply marvellous. A new feeling was in the community. The farmers had progressed, and they were comparatively well to do, everything was on the uplift, and the whole thing was due to the fact that dairying had been brought in there and had progressed along proper lines. Reference was made to olden times by two or three of the speakers. I was just thinking as I sat here that after all we have been making most astonishing progress, although some of us think it might have been much greater.

It is just twenty-one years ago last week since I began work in connection with what is now the Department of Agriculture, and I tried to run over the changes that have come over agriculture, and especially the dairy conditions of this Province in those twenty-one years. At that time the only thing we had in connection with the dairy work of the Province of Ontario was two or, I think, three dairy associations; absolutely nothing else. We had no dairy school. We had no dairy department. We had nothing working for the dairy interests of this Province but the two or three Dairymen's Associations. I remember that at the Agricultural College there were the remains of an old discarded cheese factory; nothing being done. The vats and the other apparatus were standing there covred with cobwebs. Then for the first time they appointed an instructor in dairying, and he came into the work just at the same time that I did.

We come to ten years later, 1896, and we had made some progress, not such a very great deal, but we had three dairy schools started. One was at Guelph, and the property had been purchased at Strathroy for the Western, and the Eastern school was in operation at Kingston. In that year there was expended for dairying work, apart from the general agricultural work $22,000. We had grown from the small grant in 1886 of about $8,000 to $22,000. Let us take another jump of another 10 years and come up to 1906, and we find that last year we expended, over and above the revenues, a sum of not less than $50,000 for purely dairy work in the Province of Ontario. In 1896 we expended altogether for agricultural purposes in this Province, $191,000, and last year we expended $377,000. So you see that we are making progress, and some of you who have at times become a little impatient and think we are not going as fast as we ought to, would do well to get these things into your mind and not to become impatient. A great deal of that money is spent in connection with general agricultural knowledge, but dairying gets its share along with other work. For purely dairying purposes we spent last year $50,000, as against $22,000 in 1896. The appropriation for agriculture as a whole has not quite doubled, but the appropriation for dairying work in particular has more than doubled. So that I think you will agree that the dairy end of the work has not been overlooked, and has been fairly well looked after. I am not in a position yet to tell you just what we are likely to do this year. How far we are going to advance upon that is not for me to say, but certainly there will be no backward step; there will be an advance.

The suggestion was made just a moment ago by a speaker in the audience that in the settlement of this question Mr. Ruddick has raised the strong arm of the law ought to be invoked. Well now, I think there is room there for a first-class argument, and that is when and where and under what circumstances should we invoke the law to do certain things, and when and where should we try to accomplish the same thing by persuasion, by education, by agitation? The law is simply a method of doing things prescribed by Parliament, and it has power behind it, and that power behind it is the general approval of the people. If we could get that general approval of the people at work from the other end, of course we would be accomplishing a great deal more. In regard to certain things we find that we have to resort to the rigors of the law to accomplish what we want, but the less law we have in this country the better for it, and the more we can develop and uplift the dairy industry of this country by education, by example, or by what we may call agitation, and the less we can do it by law the better it will be for our dairy work. And so, you see, when questions come up for consideration, such as you are presenting here at this convention, that the law shall do so and so, and that the law shall say so and so, you must very carefully take this into consideration, that the men who are making our laws have to think of these questions from an entirely different standpoint from which you consider it, and they are very loth, indeed, to make laws to do anything that could be better accomplished in some other way. You will generally find that the advocates of law making are likely to run ahead of all popular opinion. We have got on pretty well in connection with the dairy development in this Province without the enforcement or enactment of very vigorous or rigorous laws. It may be that in the future development of it, it will be necessary to lay down much more stringent laws than we have had in the past, but I think you will find that when you come to confront the law makers of the country with your proposition they will very carefully analyse the whole case from this standpoint: Can this work be done better by the education of the people, or must we resort to law to accomplish it? That perhaps is a standpoint that does not present itself to you so forcibly as it will to those who are concerned in making the laws of the country.

We have accomplished a great deal in connection with dairying in this Province in the last ten years, and if we make the same progress in the next ten years that we have in the past, the development of our dairy industry will have assumed enormous proportions. And yet we go on year after year holding conventions, having sessions of our dairy schools, sending out our instructors, and when we come back at the beginning of the year the same old questions seem to crop up again and again and again, and we have after all to go back to the same difficulty; and we begin to wonder if these difficulties will ever be removed or successfully met by conventions, or by instructors, or by the rigors of the law. I will guarantee there have been questions proposed and propounded in connection with this convention that have been brought up and discussed and partially settled at every convention held for the last twenty-five or thirty years, and you come back to this point every time: what we want is good raw material.

What a complicated question this dairy question has become. Here are the cheese and butter buyers, the exporters, who Mr. Ruddick has told you, can well look after themselves, and I guess they can. We do not erect schools or hold conventions or send out instructors to tell the cheese buyers or exporters how to carry out their business. They get their training in a certain line of work in the business centers of Ontario and Quebec, and we can leave them out; they will look after themselves. Next to them, however, are the cheese-makers and the butter-makers, and what have we done for them? We have established three dairy schools in this Province, and to supplement that work we have been sending out no less than thirty-five instructors during the past year to help and assist them. I think we are doing fairly well, and if we keep on improving along these lines, it will not be very long before it will be as necessary for the cheese-maker or butter-maker in the Province of Ontario to have his certificates to hang on the wall as it is for the medical man to have his diploma to hang in his surgery. That may not be done because of law, it will be done because of the necessities of the case. Whether by law or without law, there are those of us here to-night who will see that accomplished in a very short time.

Then there is the third class, the producers, the patrons, the milk producers of this country. Now the buyers will look after themselves. We have been doing fairly well and are proposing to do still better for the makers, and I see they are beginning to stand up and declare themselves of greater importance in connection with this work than in the past. You can have the most skilful and the best trained buyers in the world, and you can have the best trained and most skilful makers of butter and cheese that any country can produce, but if you have not the producers of the raw material, of what value is it all? Now of these three classes the most important and the biggest class is the producing class, and until we can in some way or other solve the question of how to improve the raw material that goes into this great manufactured product, we will have to go on holding conventions, and conducting dairy classes, and holding dairy institutes, and sending out bulletins and reports, and continue to inspect and carry on the work in the same way year after year. We have not solved that question, and we do not seem to be in a fair way of solving it; and until we do solve it we will simply be working at this question from the wrong end. Is it not about time that we became a little more rational in our method of working along these lines. I do not know who is at fault, whether it is the Department, or the dairy schools, or the instructors, or the conventions, or the people themselves. I am not going to give you my opinion in connection with that. But until we can get hold of the great producing classes of this country, and make it a necessity that nothing but first-class milk, and the best quality, shall be sent to our factories, we cannot expect to put this dairy industry upon a sure and steadfast basis. How are we going to get into the farmers' homes? How are we going to get hold of the farmer himself? How are we going to compel him to keep his stables clean; to produce the best food for the feeding of his animals; to handle his milk in a clean manner, and to have it delivered at the factory in first class shape? Are we going to do it by passing laws, and saying that the farmers must do so and so; or are we going to do it by attending these dairy institutes and conventions? We have been holding farmers' institutes and conventions for a great many years. They date away back to the year 1883. We have been preaching the doctrine of cleanliness to the farmers of this country for over twenty years, and a great deal of improvement, of course, has taken place in that time. But a new class of producers have come up, and we have got to go back and go all over the work again.

Let me tell you that the first genuine ray of hope I have seen in connection with this work came into this question, as far as I am concerned, in the month of December, when I saw gathered at the Agricultural College 400 or 500 women from the farms of the Province of Ontario. It was the most inspiring convention I ever saw, and the most interesting audience I ever addressed. Just picture to yourself a room like this packed to the doors with women from the farms of the Province of Ontario, and every woman sitting there with her pencil and note book taking notes of what was going on. I said to myself as I sat there and looked at them, "We are at last getting a grip on the agricultural community of this country such as we never had before." When 400 or 500 women from all parts of the Province of Ontario will come from the farm homes to a convention of that kind, meaning business, and to take up questions of vital importance to the agriculturists of this country, there is a hope that at last we are going to do something, and we are going to begin at the right source. The women of this country can do what the men cannot do, (applause), and they will make the men of this country do what they won't otherwise do. (Applause.) If the farmers' wives and daughters of this country tell the farmers that they have to put their stables in a clean condition; that they have to carry on their work in a clean way; that they have to keep their implements in a clean manner and send the milk to the cheese factory in a clean form, take my word for it, it will be done, and if it is not done they will know the reason why. We have at last got our foot into the farmer's home, and until you can revolutionize the farm home life of this country there is not much hope of permanent success. It is all very well for the farmers to leave home and come to London or Ottawa for a week or three days' holiday, have a pretty good time listening to the speeches, and then go back home and perhaps not be able to tell very much of what went on, except that they heard some good songs and some capital stories, and had a good time. But that is not what is going to revolutionize this country. You have to send men home with determination that they are going to clean up and do things better than they ever did before. The centre of the farm work of this country is not on the front concession or on the back road; it is not out in the stable or in the fields, but it is right in the home where the farmer lives, and if we can only start within the four walls of that home we will accomplish a great deal more than we have been able to do through conventions or dairy schools, or anything else. If we can deliver the gospel of cleanliness in the farm homes of this country there is hope of doing something; and when I saw that women's convention listening to addresses on the subject of pure milk production, and of what it meant to the health and wealth and happiness of this country, I said, "This is the best dairy convention I have ever attended, and this is the best work we have ever undertaken in this Province." The farmers' institute work grows very well, but the women's institutes of this country are growing at a tremendous pace. You have no idea of the great social revolution that is taking place in connection with the agricultural life of this country. I pleaded with these women to go home and demand that something should be done in the rural public schools of this country to help out our agricultural work. I said to them: "If you will go home and tell your husbands and your brothers that the rural school life of this country has to have some rational education put into it, then we will see it done before some of us die; if you do not do it, I doubt very much if we will see anything practically accomplished along that line." If we can get the farmers' wives and daughters of this country to work on this question of pure milk, whether for home consumption or cheese making and butter making, and if at the same time we can have introduced into our rural schools some simple instruction so that the boys and the girls will get some little knowledge of what milk is, and of the first principle and value of milk as a food and the necessity for its being kept absolutely clean, then and not till then will we have this question finally settled along these lines. We will simply have to meet year after year in convention and go over the same old ground again and again, meet the same old difficulties, and we will not make half the progress that we should make.

This great dairy industry has been the salvation of the Province of Ontario. If it had not been for the development of our butter and cheese industry the conditions of the Province of Ontario would be of most lamentable nature. It has been the salvation of the agricultural classes, and upon the development of the agricultural classes of this Province has been built up all the other industries, manufacturing, etc.

Why are we having such fairly good times in this country to-day? Simply because the farmers have been having good times. Why have they been having good times? Largely because of the development of our cheese industry, our butter industry and the allied bacon industry. The beef industry has come up at the same time, but you cannot get away from the importance of the dairy industry. The men who have their hands upon the financial pulse of the country will tell you that if they know the condition of the dairy industry to-day they can tell you what will be the condition of the financial world to-morrow; and those of us who are giving it their closest attention are only too anxious that not only shall we hold what we have gained, but that we shall gain a great deal more. And so I say this matter will never be satisfactory until we have effectually settled that question, namely, how shall we persuade the farmers of this country to give to our cheese and butter makers milk in a first class condition?"

Anything we can do along these lines, whether by education, agitation, or law-making, ought to be done. But remember that if we go at it along educational or agitational lines we will accomplish it far more securely than if we compel the farmer at the point of the pistol, so to speak, to do it. In fact, it is very questionable whether we can compel him to do that which he does not want to do.

This is a question that does not concern me or you or somebody else in particular, but it concerns all of us. It is a question that the men and women engaged in the dairy business have got to take to heart.

I trust the members of the Western Dairymen's Association will do their full part to hold their own in connection with this movement, and see that the gospel of cleanliness dominates the whole agricultural community.

RESOLUTIONS

Mr. J. N. Paget presented the following resolutions, all of which were adopted:

That, whereas, the success and educational value of this Convention, and the interest taken therein, is attributable, in a very considerable degree, to the presence of the speakers who have so kindly addressed our meetings, we desire to express our hearty thanks for their assistance and presence throughout the various sessions.

Resolved, that we, the members of this Association, desire to express our appreciation of the kindness of the Mayor and members of the London City Council in furnishing the use of the Auditorium and City Hall free of charge for the purposes of this Convention and Dairy Exhibition.

Resolved, that the thanks of the convention be, and they are hereby tendered, to the Canadian Salt Company, of Windsor, Ontario, through their General Manager, Mr. Henderson, for the very handsome medals and badges presented by the Company to the members of this Association.

That, whereas the growth of mould in butter is the most serious trouble that butter makers have to contend with and is the cause of immense loss each year to the butter industry of the country;

And whereas its causes are unknown, resolved, that it is desirable that the Department of Agriculture shall take such steps as may be necessary to have a thorough investigation of this matter made by a competent dairy chemist and bacteriologist who shall, if necessary, devote his whole time to this work.

That whereas petitions signed by several hundred cheese and butter makers have been presented to this Convention praying for the establishment of a standard of qualification for makers and asking that, after some date to be set, no maker shall be allowed to take charge of a factory unless he has had at least three years' experience in a factory or holds a diploma from a dairy school, be it resolved that in the opinion of this Convention it is desirable that our cheese and butter makers should be as well qualified as possible, and therefore we endorse the object of the petitioners and request the Ontario Department of Agriculture to give this matter its early and careful consideration.

Resolved that, whereas it has been shown that a considerable proportion of the factories and creameries of Ontario, but particularly in Eastern Ontario, have been located on sites not providing suitable sanitary facilities, and whereas the Province of Saskatchewan already has legislated along the line to be proposed; that in the opinion of this Convention the time has come when greater care should be exercised in Ontario in connection with the erection of cheese factories and creameries, and we would recommend that steps be taken to prevent the building of additional factories until their sites and plans have been submitted to the Department of Agriculture for approval, and until it has been shown to the satisfaction of the Department, or of some competent board appointed by the Department, that the erection of the proposed factory is in the best interests of the section where it is proposed to be built.

Whereas the Dominion Government has announced its decision to discontinue the operation of the cool cheese curing rooms established in 1902 on the ground that they have served the purpose for which they were intended, resolved that this Convention place on record its acknowledgment of the great value of the illustration which they have afforded, and the impetus which through their operation has been given to a most important movement for the betterment of the Canadian cheese industry, viz., the cool curing of cheese.

The Convention then adjourned.

DAIRY SCHOOLS OF ONTARIO.

CENTRAL DAIRY SCHOOL.

(In connection with the Ontario Agricultural College, Guelph.)

G. C. **Creelman**, B.S.A. M.S.	President
H. H. **Dean**, B.S.A.	Professor of Dairy Husbandry.
R. W. **Stratton**	Instructor in Separators.
C. W. **McDougall**	Instructor in Butter-making.
Alex. M. **McKay**	Chief Instructor in Cheese-making.
C. H. **Ralph**	Assistant Instructor in Cheese-making.
Geo. Taylor	Instructor in Milk-Testing.
Miss Laura Rose	Instructress in Farm Dairy.
S. F. **Edwards**, M. Sc.	Professor of Baceriology.
H. L. **Fulmer**, B.S.A.	Instructor in Dairy Chemistry.

A glance at the Register of Students for the Dairy Class of 1907, shows that it was a cosmopolitan one. The following provinces, states and countries were represented in the Class: Ontario, Quebec, Alberta, British Columbia, New York, Vermont, Massachusetts, Pennsylvania, England, Scotland, Switzerland, Argentine Republic, and Japan. Thirty-four wrote on the final examinations at the end of the term in March, of whom seventeen took the Full Course of Cheese and Buttermaking; ten were specialists in Buttermaking; and seven took the Farm Dairy Course. During the past two or three years we have discouraged students from attending for but a week or two, believing that more good is accomplished by having a smaller number remain for the full term of three months, rather than having a larger registration, many of whom remain only for a sufficient time to be able to say that they have attended the Dairy School, but who have really never become students. We have heard of cases where men have used this fact as a lever to get positions, whereas only those who have taken the full term's work of three months are entitled to say they have been students at the Dairy School. We believe that an injustice has been done the Dairy Schools by such misrepresentations. The term of three months is all too short for the work to be covered. Even our best students say the time is too short. It may be necessary to extend the term in the near future, or make the Course one of two terms of three months each.

For 1908, there will be some rather radical changes in the Dairy School Course, with a view to making better equipped men for our factories.

Among these changes (which are announced in the Short Course Calendar of the College to be issued not later than July, a copy of which can be had free on application to the President of the College) are the following:

1. Only those who have had at least one season's experience in a cheesery or creamery will be allowed to enter the Factory Course. Any others who wish to take the Dairy Course will be required to enter the Farm Dairy branch of the School. The object of this regulation is to have men of experience in the Factory Course, who will have learned the rudiments of factory work before coming to the School. These men will not need to spend so much time on routine, and will thus have more time for laboratory practice.

2. One-half of the student's time during the term will be devoted to laboratory work in Chemistry, Bacteriology, and in the shop. It is becoming more and more recognized that the sciences of Chemistry and Bacteriology are at the foundation of scientific and practical butter and cheesemaking. A man who does not understand the composition of milk and milk products, or know something of the causes of ferments, good and bad, is a weak man in a factory, no matter how good a practical man he may be. To meet this growing need, twenty-two periods of two and one half hours each of laboratory work in both Chemistry and Bacteriology will be given during the course of 1908. More attention will also be given to boilers, engines, and repair work in the shop. Every factory needs a set of piping tools and a soldering outfit; also a man who knows how to use them. In this way dollars and valuable time are saved at the factory.

3. The subjects of Chemistry and Bacteriology seem rather difficult, and some students think they are of little practical value. This is not true, but these subjects will be made optional for Farm Dairy students. A student may take the Course and receive his Certificate of Standing in the Farm Dairy without being required to take either Chemistry or Bacteriology. This opens a way for students to get most of the benefits of the Course, yet does not compel them to take subjects which may seem difficult to men whose early education has been neglected. However, the Farm Dairy Certificates will not be sufficient for those who wish to take charge of factories. Doubtless, in the near future, men will be required to have certificates from a Dairy School before they are allowed to take charge of a cheesery or creamery.

We are aiming to make the Course of 1908 as scientifically practical as we can. "Unless science makes progress practice marks time." Creamery owners are willing to pay good wages for carefully trained men. Since the session of 1907 closed we have had inquiries for an average of three or four butter and cheese makers per week at wages of $60 to $75 per month. A combination of trained brain and hand is bound to win in the race for life. Dear reader, are you content to be an *ordinary* cheese or butter maker?

H. H. DEAN,
Professor of Dairying.

EASTERN DAIRY SCHOOL, KINGSTON.

G. A. Putnam, B.S.A., Toronto	Director.
J. W. Mitchell, B.A.	Superintendent.
G. G. Publow	Instructor in Cheese Making.
J. H. Echlin	Assistant in Cheese Making.
Jas. Stonehouse	Instructor in Butter Making and Separators.
J. Buro	Assistant in Separators.
Jas. Irwin	Assistant in Butter Making.
J. F. Singleton	Instructor in Milk Testing.
W. T. Connell, M.D.	Bacteriology.
W. L. Goodwin, D. Sc.	Dairy Chemistry.

As regards the attendance, the quality of work done by the students, and the milk and cream supply, the session just closed was, to myself and staff, one of the most satisfactory in the history of the school. Three courses in all were given, viz., a Long Course extending from January 2nd to March

7th, a short three weeks' course following this and a brief course at the close of the session for syndicate instructors.

In all, 127 students were enrolled and attended the school during a longer or shorter period. The chief course of the session. the one that we lay the most stress upon, is our Long Course, and it is only to students who take this course that examinations are given and, if successful, certificates awarded, to be followed later by diplomas. Perhaps the most pleasing and promising feature of the past session was the large number of students that entered the school at the beginning of our Long Course, remained throughout and took the final examinations. In this connection the following table, giving the number of Long Course students that took the final examinations during each of the past three sessions, should prove of interest:

Session of 1905	19 students.
" " 1906	26 "
" " 1907	40 "

This large increase from year to year is very gratifying, indeed, as it is indicative of an awakening on the part of cheese and butter makers to the importance of thoroughly qualifying themselves for their work. The owners of factories are becoming more and more careful as to the men they place in charge, and are demanding well trained makers for these positions, and it will not be many years, we hope, until the holding of a certificate and diploma from one of our Dairy Schools will be required of young men seeking positions as factory managers. As tuition is free in our dairy schools, a dairy school course is quite within reach of every young man, and it says little for one who has not sufficient ambition to take such a course and thoroughly qualify himself for his work. A move in the right direction has been made this year in exacting of every syndicate instructor that he hold a Dairy School diploma.

The subjects taken up in our Long Course are, Dairy Science, Cheese-Making, Separators and Creaming of Milk, Butter-Making, Milk-Testing, Dairy Bacteriology and Dairy Chemistry. A special lecturer in the last named subject has been added to our staff within the past two years, and our students now receive their chemistry lectures in the Chemical Laboratory of the School of Mining and Agriculture, where the lectures are demonstrated and the students are required to do practical work. This addition to our course has broadened it greatly and has been much appreciated by our students. While the students receive lectures on each of the foregoing subjects, the major portion of each day is spent in the different departments of the school where practical cheese-making, butter-making, milk-testing, etc., are conducted and the students afforded every opportunity to put into practice the principles taught.

The milk and cream supply during the past session was the most satisfactory in years, being regular in its delivery and quite satisfactory as to quantity. As practically all of the creameries in Ontario are cream-gathering creameries, our students were given a thorough training in the handling of hand as well as power separators, and arrangements were made for a regular supply of gathered cream.

While sufficient experimental work is done in our school to awaken in the students a spirit of investigation and train their powers of observation, the major portion of the practical work in the school consists in the teaching of the best methods of handling milk and cream and making butter and cheese from the same. It is our desire and aim not only to lay a thorough foundation in the principles of dairying with our students, but to teach them how milk should be handled to make the most and best quality of cheese and butter from it.

Respectfully submitted,

J. W. MITCHELL,
Superintendent.

WESTERN DAIRY SCHOOL, STRATHROY.

GEORGE H. BARR	Superintendent.
J. R. BURGESS	Instructor in Cheese-making.
FRED. DEAN	Instructor in Butter-making.
E. N. HART	Instructor in Separators.
FRANK HERN	Instructor in Milk-testing.
S. F. EDWARDS, M. Sc	Bacteriologist.
H. L. FULMER	Instructor in Dairy Chemistry.

During the term of 1906, twenty-eight cheese and butter makers attended the School. Some of these could only remain for a short time on account of their factory work.

Thirteen wrote on the examinations. Five examinations were held during the term, and the standing of the students was based upon these five examinations.

This arrangement in regard to examinations seemed to give the best of satisfaction both to the students and staff. All the students passed the examinations. Five passed with first-class and six with second-class honors.

Considerable experimental work was caried on in making butter, preparing cultures, testing cream by measure and by weight, and handling curds in different ways.

In making butter it was found quite possible to increase or decrease the percentage of overrun by different methods of churning the cream and washing the butter. We also had very good results from using a culture carried on in cream.

In comparing the testing of cream by weight and by measure, there is no doubt that the correct way is to weigh the sample for the Babcock tester.

Weighing gives equal justice to the producers of both rich and thin cream, while measuring with the pipette does not. Especially is this so with sour cream.

In cheese-making, cutting the curd fine and dipping it with a small acid, even if in a soft condition, gave the best results in handling overripe milk.

GEO. H. BARR,
Superintendent.

ANNUAL REPORTS

OF THE

Live Stock Associations

OF THE

PROVINCE OF ONTARIO

1906 and 1907

Dominion Cattle Breeders' Association
Dominion Sheep Breeders' Association
Dominion Swine Breeders' Association
Ontario Poultry Associations
Provincial Winter Fairs
Ontario Horse Breeders' Association
and Exhibition
Ontario Spring Stallion Shows

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1907

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To the Honourable WILLIAM MORTIMER CLARK, K.C.,
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR :

The undersigned begs to present herewith for the consideration of His Honour the Reports of the Live Stock and Poultry Associations for 1906; also the Reports of the Provincial Winter Fairs, the Reports of the Ontario Horse Breeders' Association and of the Spring Stallion Shows held in Ontario in 1906 and 1907.

Respectfully submitted,

NELSON MONTEITH,

Minister of Agriculture.

TORONTO, 1907.

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DOMINION CATTLE BREEDERS' ASSOCIATION.

ANNUAL MEETING.

The annual meeting of the Dominion Cattle Breeders' Association was held in the Palmer House, Toronto, February 5th, 1907 at 11 a.m. The Vice-President for Ontario, Arthur Johnston, was in the chair.

On motion the minutes of the last annual meeting were taken as read.

REPORT OF THE EXECUTIVE.

The Executive submitted the following report:

Provincial Auction Sales of Cattle. Provincial Auction Sales of Cattle were held during 1906 at Guelph, Port Perry and Ottawa, on February 27th, March 2nd and 9th respectively.

The following are the numbers of animals sold and the average prices:

Guelph: 15 females sold for $1,012.50; average, $67.50; 34 males sold for $2,685; average, $78.97; 49 animals sold for $3,697.50; average, $75.45.

Port Perry: 11 males sold for $951.00; average, $86.45; 12 females sold for $946.00; average, $78.83; 23 animals sold for $1,897.00; average, $82.47.

Ottawa: 20 males sold for $1,500; average, $75.00; 16 females sold for $1,295; average, $80.93; 36 animals sold for $2,795; average, $77.63.

At the present time Provincial Auction Sales are being arranged for Guelph, February the 27th; Port Perry, March 1st, and Ottawa, March 8th. The Ontario Department of Agriculture has undertaken to arrange for the general advertising for these sales. This does not include the advertising in the local district. Besides this the Department has agreed to pay the freight on all animals purchased by residents in Ontario to go to the owner's station in Ontario.

Transportation of Stock. During 1906 four cars of pure-bred stock were shipped to the West These cars contained 16 horses, 41 cattle, 25 sheep and 14 swine. The stock was collected from 48 breeders in Ontario, and was shipped to 60 points in the West between Winnipeg and the Pacific Coast. The freight collected amounted to $1,281.72, and the expenses of sending out the cars were $1,253.11, leaving a balance to the credit of the cars of $28.61. This, together with the balance of $15.41 to the credit of the cars at the beginnning of the year, now makes a fund of $44.02 to provide for possible overdrafts.

As this method of shipping stock is of great value to people who sell small lots of stock to Western buyers, it is desirable to give the rates as much publicity as possible. We, therefore, reprint the following from the Report for 1903.

Schedule of Rates for Stock to Manitoba and the North-west in Association Car. The following are particulars of rates charged for registered live stock in Association car. These rates include transportation, care and feed during the time stock is in Association car. If it is necessary to ship to some point to meet the car, or if it is necessary, to re-ship from the main line in the West to the destination, these charges in each case will be extra. Registration certificates must, in all cases, be produced for the inspection of the station agent at the shipping point.

The main line of the Canadian Pacific Railway, through Manitoba and the North-West Territories, is divided into the following sections:

Section 1, Winnipeg and East thereof.
" 2, Bergen to Oak Lake.
" 3, Routledge to McLean.
Section 4, Balgonia to Aikens.
" 5, Swift Current to Bowell.
" 6, Suffield to Calgary.

CATTLE.

Bulls.

Age.	Sec. 1.	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.	Sec. 6.
Under 6 months...........	$6 00	$6 50	$7 00	$7 50	$8 00	$8 50
6 to 12 "	8 00	8 75	9 50	10 25	11 00	11 75
12 " 18 "	10 00	11 00	12 00	13 00	14 00	15 00
18 " 24 "	12 00	13 25	14 50	15 75	17 00	18 25
Over 24 "	14 00	15 50	17 00	18 50	20 00	21 50

Heifers and Cows.

Age.	Sec. 1.	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.	Sec. 6.
Under 6 months...........	$6 00	$6 50	$7 00	$7 50	$8 00	$8 50
6 to 12 "	8 00	8 75	9 50	10 25	11 00	11 75
12 " 18 "	9 50	10 50	11 50	12 50	13 50	14 50
18 " 24 "	11 00	12 00	13 00	14 00	15 00	16 00
Over 24 "	12 50	13 50	14 50	15 50	16 50	17 50

HORSES.

Stallions 10 per cent. more than bulls.
Mares 10 per cent. more than cows.

PIGS.

Must be crated in all cases.

Weight (including crate).	Sec. 1.	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.	Sec. 6.
Under 50 lbs..............	$1 75	$2 00	$2 25	$2 75	$3 00	$3 25
Over 50 to 100 lbs.	3 00	3 50	4 00	4 50	5 00	5 50
" 100 " 200 "	5 00	5 75	6 50	7 25	8 00	8 75
" 200 " 300 "	7 00	7 75	8 50	9 25	10 00	10 75
" 300 " 400 "	9 00	9 75	10 50	11 25	12 00	12 75
Over 400 lbs	11 00	11 75	12 50	13 25	14 00	14 75

SHEEP.

Three sheep or under must be crated.

Weight (including crate).	Sec. 1.	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.	Sec. 6.
Under 100 lbs.............	$3 50	$3 70	$3 90	$4 10	$4 30	$4 50
100 lbs. up to 200..........	4 00	4 20	4 40	4 60	4 80	5 00
200 and over....	4 50	4 70	4 90	5 10	5 30	5 50

When three sheep from one shipper to one consignee are received in one shipment they will be carried without being crated. In such cases when from five to nine sheep are received, fifty cents will be deducted for each sheep from the above quotations; when the number is ten or more sheep one dollar will be deducted.

PROVINCIAL WINTER FAIR, GUELPH. The following are the entries in the open classes for Beef Cattle and Dairy Cattle at the Winter Fair at Guelph, 1906, together with the prizes offered in each class:

BEEF CATTLE.

Class.	No. of Entries.	Prizes Offered.	Prizes Paid.
Shorthorns	25	$371 00	$348 00
Herefords and Aberdeen-Angus	19	282 00	231 00
Galloways and Devons	12	150 00	135 00
Grades or Crosses	38	395 00	360 00
Export Steers	6	100 00	100 00
	100	$1,298 00	$1,174 00

DAIRY CATTLE.

Class.	No. of Entries.	Prizes Offered.	Prizes Paid.
Shorthorns	8	$285 00	$ 95 00
Ayrshires	17	186 00	169 00
Holsteins	6	235 00	190 00
Jerseys	7	135 00	....
Guernseys	..	135 00	....
Grades	3	135 00	15 00
	41	$1,111 00	$469 00

EASTERN ONTARIO LIVE STOCK AND POULTRY SHOW. The following statement shows the number of entries made in the Beef Cattle and Dairy Cattle Departments at the Eastern Ontario Live Stock and Poultry Show at Ottawa, 1906; also the prizes offered in the different classes and the prizes paid:

BEEF CATTLE.

Class.	No. of Entries.	Prizes Offered.	Prizes Paid.
Shorthorns	17	$192 00	$166 00
Herefords and Aberdeen-Angus	11	100 00	70 00
Galloways and Devons	..	100 00	....
Grades or Crosses	32	192 00	192 00
Export Steers	6	90 00	90 00
	66	674 00	518 00

DAIRY CATTLE.

Class.	No. of Entries.	Prizes Offered.	Prizes Paid.
Shorthorns	3	$100 00	$65 00
Ayrshires	5	125 00	75 00
Holsteins	15	200 00	195 00
Jerseys and Guernseys	3	100 00	65 00
Grades	7	100 00	75 00
	33	625 00	475 00

IMPORTATION OF CATTLE. A great many cattle are being imported into Canada free of duty, which are not recorded in any of the Canadian books of record for the various breeds. The result is that some of the owners afterwards record them here, but others continue to record them in foreign records. The term "pure-bred," as applied to cattle in Canada, should refer to cattle registered in the Canadian National Records. We now have a complete system of National records for different breeds of live stock, the standard for which is as high as that of any records in the world. They are authorized by the Government of Canada, and are conducted by the Associations representing each of the breeds. It is also a fact that large numbers of so-called pure-bred animals are being brought into Canada and sold for any price that can be obtained for them. Such animals are often of low quality, and recorded in books that are not recognized, even in the country from which the animals come; but they are brought into this country as pure-bred, and sold as such.

It is, therefore, recommended that this Association should take action to impress on the Dominion Government the importance of changing the regulations affecting the importation of live stock; to provide that stock must first be recorded in our books of record for the breed to which the animals being imported belong, and, if brought in for sale, must be imported, and owned by a British subject residing in Canada before they are entitled to enter free of duty.

Financial Statement.

To the Thirty-first of January, 1907.

Receipts.		Expenditures.	
Cash on hand from previous year	$127 95	Grants to Fairs	$215 00
Members' fees	303 00	Directors' fees and expenses	16 60
		Postage and stationery	1 50
		Printing	5 90
		Auditor	2 00
		Incidentals	1 52
Total	$430 95	Total	$242 52
		Balance on hand	188 43

Examined and found correct, this 1st of February, 1907.

(Signed) J. M. Duff, *Auditor*

All of which is respectfully submitted.

Signed on behalf of Executive,

Arthur Johnston,
Vice-President for Ontario.

A. P. Westervelt,
Secretary-Treasurer.

RESOLUTIONS.

After considerable discussion the following resolutions were passed:

Moved by R. J. Mackie and seconded, "That the Hereford and Aberdeen-Angus class at the Winter Fair be separated and that prizes be given to each individual class." Carried.

During the discussion of the clause on the Importation of Live Stock, W. G. Ellis, objected to the words, "registered in the Canadian National Records." He reminded the meeting that the Canadian Holstein men have not yet seen fit to come into the National Records scheme, but were incorporated under a Dominion Act antedating it by many years. The Holstein men, however, felt the need of the proposed regulation, and would welcome it. He, therefore, moved an amendment that the wording be changed to read: "The term "pure-bred" as applied to cattle in Canada, should refer to cattle registered in record incorporated under a Dominion charter." J. G. Clark, pointed out that we should stand by the National Records system, and not leave a loophole, thereby encouraging the formation of other independent records. The amendment was lost.

The clause was finally adopted, with an amendment that all the words be struck out after "belong" near the end of the second paragraph. It was also informally suggested that the desired regulation should except settlers' effects.

It was then moved and seconded, "That the report of the Executive as amended be adopted." Carried.

The Secretary explained that owing to a change in the Act the President and Vice-President would be elected by the Directors, and that they as in most other Associations would elect the Executive Committee.

Moved and seconded, "That the directors be authorized to make the changes in the Constitution of this Association necessary to conform with the changes in the Act." Carried.

OFFICERS FOR 1907.

President	John Gardhouse, Highfield.
Vice-President	W. W. Ballantyne, Stratford.
Secretary-Treasurer	A. P. Westervelt, Toronto.

Directors.

Shorthorns	John Isaac, Markham ; Arthur Johnston, Greenwood.
Herefords	R. J. Mackie, Oshawa ; Alfred Stone, Guelph.
Aberdeen-Angus	A. McKinnon, Hillsburg ; J. W. Burt, Coningsby,
Galloways	Lieut-Col. D. McCrae, Guelph ; Robt. Shaw. Brantford.
Ayrshires	W. W. Ballantyne, Stratford ; W. F. Stephen, Huntingdon, Que.
Holstein-Friesian	G. W. Clemons, St. George ; A. C. Hallman, Breslau.
General Director	John Gardhouse, Highfield.
Ontario Agricultural College	President G. C. Creelman ; Prof. G. E. Day.
Live Stock Commissioner	Dr. J. G. Rutherford.

Executive Committee.

John Gardhouse, Highfield.
W. W. Ballantyne, Stratford.
A. P. Westervelt, Toronto.
J. W. Burt, Coningsby.
Lieut.-Col. D. McCrae, Guelph.

Delegates to Fair Boards.

Toronto: John Gardhouse, Highfield.
Ottawa: Peter Christie, M.P., Manchester ; Robert Ness, Howick, Que.
London: Capt. T. E. Robson, London ; A. W. Smith, Maple Lodge.
Provincial Winter Fair: W. W. Ballantyne, Stratford ; J. T. Gibson, Denfield ; John Bright, Myrtle.
Eastern Ontario Live Stock and Poultry Show: J. H. Grisdale, Ottawa ; N. F. Wilson M.P., Cumberland ; John Gardhouse, Highfield.
Auditor: J. M. Duff, Guelph.

DIRECTORS' MEETING.

A meeting of the directors of the Dominion Cattle Breeders' Association was held in the Palmer House, Toronto, on February the 23rd, 1907, at 9 a.m. On motion, Lieut. Col. McCRAE, was appointed Chairman.

Moved by JOHN GARDHOUSE, seconded by W. W. BALLANTYNE, "That clauses 9 and 15 of our Constitution be amended to conform to the new regulations of the Act respecting Agricultural Societies, viz., after the sixth word in first line of clause 9 strike out the words "the President, Vice-President;" clause 15 shall be added to by these words "At the first meeting of the Board of Directors following each annual meeting, a President and a Vice-President shall be elected." Carried.

Moved by R. J. MACKIE, seconded by ROBERT SHAW, "That this Association make application for affiliation with the Canadian National Live Stock Association." Carried.

The meeting then adjourned.

(A list of members of the Dominion Cattle Breeders' Association is published in the appendix to this Report.)

DOMINION SHEEP BREEDERS' ASSOCIATION.

ANNUAL MEETING.

The annual meeting of the Dominion Sheep Breeders' Association was held in the Palmer House, Toronto, on February 5th, 1907, at 3 o'clock p. m. The President, J. M. Gardhouse occupied the chair.

As the minutes of the last meeting had been published and distributed to members, they were on motion taken as read.

PRESIDENT'S ADDRESS.

I wish to thank you for the honor you conferred upon me, in appointing me to this position a year ago. It will not be necessary for me to say much in regard to the sheep industry. The increased prices for wool and mutton during the past year have caused a great demand for sheep in the United States, and I do not think there is any better business, or any more paying business, than the raising of sheep. It might be well for me to say at least a word or two as to the success of our Canadian breeders at the shows in this country and also the great International Show at Chicago. You will agree with me that Canadians, as sheep breeders and sheep exhibitors, are second to none in the world. They certainly demonstrated that at the Chicago Show. I will not take up any more of your time, but will at once proceed with the business of the meeting.

REPORT OF THE EXECUTIVE.

The Executive submitted the following report:

Canadian National Sheep Records. During the year of 1906, on account of the Sheep Records which have been established, the membership of the Association has been increased as well as the general receipts. Following the report of the Executive last year, a Committee was appointed by the Dominion Department of Agriculture, consisting of the following: F. W. Hodson, Ottawa; Hon. N. Garneau, Quebec; Hon. John Dryden, Toronto; Robert Miller, Stouffville; John A. McGillivray, Toronto; A. W. Smith, Maple Lodge.

This committee was appointed to take up, through the Record Committee, some plan of international records with representatives of the American Associations. This Committee met with the representatives of the American Shropshire Registry Association at Buffalo, on March 17th, 1906, and the following agreement was entered into:

Agreement between the National Record Board of Canada and the American Shropshire Registry Association:

1. All pedigrees received by the Canadian office shall be transferred to the Registry office of the American Association for registration.

2. The owners of the Canadian sheep, registered under this agreement in the United States Records, shall be members of the American Association where said record is made, or shall pay the additional fee charged for registration to non-members.

3. All pedigrees transferred from the Canadian office to the American Association shall be fully prepared for the printers before transmission.

4. For each pedigree transmitted from the Canadian office for publication in the American Records, there shall be paid to the American registry office 30 cents per pedigree for all certificates issued to members of the Association, and for certificates issued to non-members, 80 cents shall be so paid.

5. Registration numbers for Canadian certificates shall be allotted (in block) by the American Secretary; when these are used an additional block of numbers shall be furnished.

6. A representative, approved of by the American secretaries, shall be placed in the Canadian office, who shall be authorized by power of attorney to sign the certificates of registration; such officer to be paid by the Canadian authorities.

After trying a number of times to make arrangements to meet with the representatives of the other American Record Associations, and being unable to do so, it was decided by the Committee to arrange for records for the other breeds entirely independent of the American records. Records have now been established for the following breeds: Cotswolds, Leicesters, Lincolns, Shropshires, Southdown, Dorset Horns, Oxfords and Hampshires.

The following is a statement of registrations for sheep up to December 31st, 1906.

	Registrations.	Transfers.	Ancestors.	Membership.	Refunds.
To 1st May	....	4	....	......	......
May	7	....	....	......	$1 50
October	....	2	...	$4 00	......
November	150	13	566	14 00	2 50
December	167	81	391	23 00	3 60
	324	100	957	$41 00	$7 60

The registrations, according to provinces, are as follows:

	Registrations.	Transfers.	Ancestors.
Ontario	100	35	183
British Columbia	....	1	4
Quebec	219	61	770
United States	5	3	....
	324	100	957

The monthly receipts on account of the Sheep Records at Ottawa (including memberships) are as follows:

To 31st December, 1905	$17 75
January to 30th April	7 50
May	7 00
July	7 00
August	34 60
September	89 25
October	25 00
November	171 25
December	108 65
	$468 00

Provincial Sheep Associations. In the last annual report the request was made in the form of a resolution passed by the Quebec Breeders' Association that any money received from the Province of Quebec for memberships should be retained by the Provincial Sheep Breeders' Association of Quebec, which Association had previously had charge of the Sheep Records in Quebec.

As National Sheep Records are now organized, some arrangement should be made regarding the distribution of the profits among all the Provinces interested, as well as the Province of Quebec. The following is suggested as a general plan to be adopted:

That the membership fees received from the members residing in each province should be returned to the Provincial Association looking after the sheep interests in that province every three months. This will enable the Provincial Associations to retain their membership and present organization without requiring an additional membership fee. At the end of the year, after deducting the general expenses of the Dominion Association, the profits from registration fees should be equitably divided among the Provincial Associations. In the case of any Province, where there is no Association to look after the interest of sheep, it is recommended that the profits accruing should be spent in the interest of the sheep industry in that Province in such manner as may be decided annually by the Dominion Sheep Breeders' Association, until a Provincial Association is formed.

Public Auction Sales of Pure-bred Sheep. At the last annual meeting the question of holding sheep sales was left with the Executive to deal with. A meeting of the Executive was called on June 8th, 1906, to consider the advisability of holding an auction sale of pure-bred sheep, and the following is the report of the meeting:

After considering the matter it was decided: (1) That if a sale were to be held nothing should be offered but first-class animals. (2) That on account of the demand for pure-bred sheep having been so keen during the past few months it was not considered probable that the kind of sheep required for a public auction sale would be held by the breeders for this purpose. (3) It was therefore decided that it was not wise to attempt to hold an auction sale of pure-bred sheep during the present year.

Winter Fair. At the last annual meeting of the Sheep Breeders' Association it was suggested that there be two classes for grade sheep at the Winter Fair, one for long-wool wethers and one for short-wool wethers; also that there should be a championship prize for wethers in all classes.

The Executive is glad to be able to report that arrangements were made to have these changes made in the classification of the prize list.

The following statement shows the number of entries in the classes for sheep at the Winter Fair at Guelph, 1906, together with the prize money offered in each class, and the amount paid:

Class.	No. of Entries.	Prizes Offered.	Prizes Paid.
Cotswolds	30	$131 00	$129 00
Lincolns	23	131 00	129 00
Leicesters	43	156 00	151 00
Oxfords	28	186 00	155 00
Shropshires	34	231 00	231 00
Southdowns	41	206 00	206 00
Dorset Horns	23	104 00	102 00
Hampshires and Suffolks	10	86 00	72 00
Grades or Crosses	53	152 00	152 00
	285	$1,383 00	$1,327 00

EASTERN ONTARIO LIVE STOCK AND POULTRY SHOW. The following statement shows the number of entries in the classes for sheep at the Eastern Ontario Live Stock and Poultry Show in 1906, the amount of prize money offered and the amount paid.

Class.	No. of Entries.	Prizes Offered.	Prizes Paid.
Cotswolds	12	$89 00	$66 00
Lincolns	15	89 00	71 00
Leicesters	12	89 00	84 00
Oxfords	6	89 00	35 00
Shropshires	..	89 00	......
Southdowns	10	89 00	68 00
Dorset Horns	11	74 00	48 00
Hampshires and Suffolks	13	74 00	66 00
Grades and Crosses	15	78 00	74 00
	94	$760 00	$512 00

PROTECTION OF SHEEP AND TAXING OF DOGS. Printed herewith are "Extracts from the Act for the Protection of Sheep and to impose a Tax on Dogs," as it is now in force in Ontario. The extracts given contain all those parts of the Act directly affecting persons interested in sheep or dogs, the omitted parts being repetitions and directions concerning legal and other proceedings. Your Executive has given the Act careful consideration, and suggests a number of changes to make the Act more effective. Parts that it is considered advisable to strike out are printed in *italics* and suggested additions are printed in **black-face** type. Members are asked to give these suggestions careful consideration.

(1) *Subject to the provision in the next section*, there shall be levied annually, upon the owner, possessor or harborer of each dog, an annual tax of $1 for *a* **one** *dog*, **$2 for each dog more than one,** and *$2* (**$5**) for a bitch, provided, nevertheless, that the owner or possessor of a kennel of pure-bred dogs which are registered in the "Canadian Kennel Register" may pay to the treasurer of the municipality the sum of $10 as a tax upon such kennel for the year.

(2) *Upon the petition of twenty-five ratepayers the council of any city, town, township, or incorporated village may provide by by-law that the said tax or any part of it shall not be levied in said municipality.*

(3) The assessors of every municipality *within which a by-law has not been passed as provided in the preceding section* shall at the time of making their annual assessment, enter on the assessment roll in a column prepared for the purpose, opposite the name of every person assessed, and also opposite the name of every resident inhabitant not otherwise assessed, being the owner or keeper of any dog, the number **and sex of dogs** by him owned or kept.

(4) The owner, possessor or keeper of any dog shall *when* (**be**) required by the assessors **to** deliver to them, in writing, a statement of the number of dogs owned or kept by him, whether one or more; and for every refusal or neglect to do so, and for every false statement made in respect thereof, he shall incur a penalty of $5 to be recovered with costs, before any Justice of the Peace having jurisdiction in the municipality.

(5) In cases where persons have been assessed for dogs, and the collector has failed to collect the taxes authorized by this Act, he shall report the same under oath to any Justice of the Peace, and such Justice shall require such dogs to be destroyed by the possessors thereof, or by a constable, and for the purpose of so doing any constable may enter on the premises and destroy such dogs.

(6) The money collected and paid to the clerk or treasurer of any municipality under the preceding sections, shall constitute a fund for satisfying such damages, as arise in any year from dogs killing or injuring sheep or lambs in such municipality; and the residue, if any, shall form part of the assets of the municipality for the general purposes thereof; but when it becomes necessary in any year for the purpose of paying charges on the same, the fund shall be supplemented to the extent of the amount which has been applied to the general purposes of the municipality.

(7) *In case the council of any city, town, township or incorporated village, deems it advisable that the tax by this Act established should be maintained, but that the application of the proceeds should be dispensed with, it shall be lawful for such council by by-law to declare that such application shall be dispensed with; and thereafter during the continuance of such by-law the clauses of this Extract numbered 5, 6, and 13 to 19 inclusive shall have no force in the municipality.*

(8) Any person may kill

(*a*) Any dog which he sees pursuing, worrying or wounding any sheep; or

(*b*) Any dog without lawful permission in any enclosed field or farm which the owner or occupant thereof or his servant finds giving tongue and terrifying any sheep, or

(*c*) Any dog which any person finds straying between sunset and sunrise on any farm whereon any sheep are kept;

But no dog so straying which is kept by the occupant of any premises next adjoining the said farm, or next adjoining that part of any highway or lane which abuts on said farm, nor any dog either when securely muzzled, or when accompanied by or being within reasonable call of any person having the charge of said dog, shall be so killed unless there is reasonable apprehension that such dog if not killed is likely to pursue, worry, wound or terrify sheep then on the said farm.

(9) On a complaint made before a Justice of the Peace that any person owns, or has in his possession, a dog which has within six months previous worried or injured or destroyed any sheep the Justice may require such person to appear before him to answer to such a complaint.

(10) In case any person is convicted of having in his possession a dog which has worried or injured or destroyed any sheep, the Justice *may* (**shall**) make an order for the killing of such dog within three days, and in default thereof *may* (**shall**) impose a fine upon such person not exceeding $20 with costs.

(11) The owner of any sheep killed or injured by any dog shall be entitled to recover the damage from the owner or keeper of such dog, by an action before a Justice of the Peace, and such aggrieved party shall be entitled so to recover in such action whether the owner or keeper of such dog knew or did not know that it was vicious or accustomed to worry sheep.

(12) The keeper of any dog to whom notice is given of any injury done by his dog, shall within forty-eight hours after such notice cause such dog to be killed, and for every neglect so to do he shall forfeit a sum of $2.50 and a further sum of $1.25 for every forty-eight hours thereafter until the same is killed if it is proved that such dog has worried or otherwise injured such sheep; but no such penalties shall be enforced in case it appears that it was not in the power of the owner or keeper to kill such dog.

(13) In case the owner of any sheep so killed or injured proceeds against the owner or keeper of the dog that committed the injury, and is unable on the conviction of the offender to levy the amount ordered to be paid, then

the council of the municipality shall order their treasurer to pay to the aggrieved party two-thirds of the amount ordered to be paid by the Justice under the conviction in addition to the costs of the proceedings.

(14) The council of each township, town or village, shall at their first meeting each year appoint a competent person, to be known as the Sheep Inspector, whose duty it shall be to inspect the injury done to sheep by dogs in cases where the owner or keeper of the dog or dogs committing the injury cannot be found, and the aggrieved party intends to make claim for compensation from the council of the municipality. Said appointee shall investigate the injury within 48 hours after notice is given to him and forthwith make his report in writing to the Clerk of the Council as early as possible after the investigation, giving in detail the extent of injuries and amount of damage done. This report shall be used by the council as evidence in adjusting the claim.

(15) **Subject to the provision in the next following section**, the owner of any sheep killed or injured by any dog, the owner or keeper of which is not known, may within three months apply to the council for compensation for the injury; and if the council is satisfied that the aggrieved party has made diligent search and inquiry to ascertain the owner or keeper of such dog, and that such owner or keeper cannot be found, they shall award to the aggrieved party a sum not exceeding two-thirds of the amount of the damage sustained by him.

(16). The owner of any sheep or lamb killed or injured who intends to claim compensation from the council of the municipality shall notify the Sheep Inspector in person, or in writing, within 48 hours after the injury is committed.

(17) After the owner of such sheep has received from the municipality any money under either of the preceding sections, his claim shall thenceforth belong to the municipality, but in case the municipality recovers from the offender more than they had paid, besides their costs, they shall pay over the excess to the aggrieved party.

(18) The owner of any sheep killed or injured while running at large upon any highway or unenclosed land shall have no claim under this Act to obtain compensation from any municipality.

(19) *If the council of any city, town, township or incorporated village by by-law decided to dispense with the levy of the aforesaid tax, the owner of any sheep may, notwithstanding, sue the owner or keeper of any dog for the damage done.*

IMPORTATION OF LIVE STOCK. A great deal of live stock is being imported into Canada free of duty which is not recorded in any of the Canadian books of record for the various breeds. The result is that some of the owners afterwards record the animals here, but others continue to record them in foreign records. The term "pure-bred," as applied to live stock in Canada, should refer to live stock registered in the Canadian National Records. We now have a complete system of National Records for different breeds of live stock, the standard for which is as high as that of any Records in the world. They are authorized by the Government of Canada, and are conducted by the associations representing each of the breeds. It is also a fact that large numbers of so-called pure-bred animals are being brought into Canada and sold for any price that can be obtained for them. Such animals are often of low quality, and recorded in books that are not recognized even in the country from which the animals come, but they are brought into this country as pure-bred and sold as pure-bred.

It is, therefore, recommended that this Association should take action to impress on the Dominion Government the importance of changing the regulations affecting the importation of live stock, to provide that stock must first be recorded in our books of record for the breed to which the animals being imported belong, and if brought in for sale must be owned and imported by a British subject residing in Canada before they are entitled to enter free of duty.

Financial Statement.

To 31st January, 1907.

Receipts.		Expenditures.	
Cash on hand from previous year, as per last report	$67 16	Directors' fees and expenses	$35 21
Membership fees	169 00	Printing	6 90
Registration fees	427 00	Delegates to Fair Boards	14 15
		Refund of Record fees	5 00
		Quebec Association, on account of memberships	53 00
		Auditor	2 00
		Incidentals	1 02
		Balance on hand	545 88
Total	$663 16	Total	$663 16

Examined and found correct this 1st day of February, 1907.
(Signed) J. M. Duff, Auditor.

All of which is respectfully submitted,
J. M. Gardhouse, President. John Campbell, Vice-President. A. P. Westervelt, Sec.-Treas.

RESOLUTIONS.

The report of the Executive was then taken up clause by clause, and after considerable discussion regarding that part of the report referring to the establishment of Sheep Records the various clauses were adopted up to that referring to the "Protection of Sheep and Taxing of Dogs."

It was decided that section 13 of this clause should read as follows: In case the owner of any sheep so killed or injured proceeds against the owner or keeper of the dog that committed the injury, and is unable on the conviction of the offender to levy the amount ordered to be paid, then the council of the municipality shall order their treasurer to pay the aggrieved party, *not less than* two-thirds of the amount ordered to be paid by the Justice under the conviction in addition to the costs of the proceedings.

In section 15, seventh line, the words "not exceeding" were changed to read "not less than."

Moved by John Campbell, seconded by R. H. Harding,—"That the changes suggested in the Act "for the protection of sheep and to impose a tax on dogs" be adopted with the amendments made, and that the Legislature be asked to consider the changing of the Act at the earliest possible moment." Carried.

The clause on "Importation of Live Stock" was then considered, and it was moved by Col. McEwen, seconded by Mr. Pettit,—"That the matter be referred to the Executive and that they take the matter up with Dr. Rutherford." Carried.

The financial statement was then read, and on motion was adopted.

Moved by D. G. Hanmer, seconded by John Jackson,—"That the directors be instructed to make the suggested changes in the constitution and by-laws so as to correspond with the changes in the Ontario Act of incorporation for the appointment of President and Vice-President." Carried.

Mr. Lloyd-Jones took up the subject of duty on wool and sheep, making a motion asking the Government that the duty on wool be put at 10 cents a pound, and the duty on lambs $1 a head. Objection was taken to this Breeders' Association dealing with a commercial question of the kind, and the subject was referred back to the committee appointed last year.

Mr. Andrew Whitelaw, representing the Leicester Breeders' Association, brought up a resolution passed by that association at Guelph, protesting against the fifteen days quarantining of imported sheep. In reply, Dr. Rutherford pointed out that the fifteen days after disembarkation was only part of a nominal 30-days quarantine, commencing at the time the sheep cleared from the port of departure. This is necessary for two reasons. In the first place our quarantine regulations accord with those of the United States, and any slackening of the precautions on our part would probably result in the inauguration of a quarantine system along the international boundary. In the second place, thirty days' quarantine is necessary as a safe-guard against the introduction of foot-and-mouth disease from the Old Country.

In connection with this matter, Arthur Johnston said that in 1875 he brought out foot-and-mouth disease, and in six weeks it had extended to St. Louis.

Moved by R. H. Harding, seconded by John Jackson, "That a committee be appointed, consisting of the mover, Col. McEwen, John Campbell and the Secretary, to lay before the management of the International Live Stock Exposition the necessity for better Customs Regulations being given to Canadian exhibitors at the International Show at Chicago, and that full particulars be placed in the hands of Dr. Rutherford" Carried.

OFFICERS FOR 1907.

President	John Campbell, Woodville.
Vice-President	Andrew Whitelaw, Guelph.
Secretary-Treasurer	A. P. Westervelt, Toronto.

Directors.

Cotswolds	Lt. Col. D. McCrae, Guelph.
Leicesters	Andrew Whitelaw, Guelph.
Hampshires and Suffolks	John Kelly, Shakespeare.
Southdowns	John Jackson, Abingdon.
Dorsets	R. H. Harding, Thorndale.
Lincolns	J. T. Gibson, Denfield.
Oxfords	T. R. Arkell, Arkell.
Shropshires	Wm. A. Dryden, Brooklin.
Ontario Agricultural College	Prof. G. E. Day, Guelph.

General Directors	J. M. Gardhouse, Weston. John Campbell, Woodville. A. W. Smith, Maple Lodge.
Auditor	J. M. Duff, Guelph.

Representatives to Record Board.

J. M. Gardhouse, Weston. R. H. Harding, Thorndale.

Delegates to Fair Boards.

Canadian National: Hon. John Dryden, Toronto; John Jackson, Abingdon.

Central Canada: N. F. Wilson, Cumberland.

Western Fair, London: Lt. Col. R. McEwen, Byron; Geo. Telfer, Paris.

Provincial Winter Fair: A. W. Smtih, Maple Lodge; John Jackson, Abingdon: Lt. Col. R. McEwen, Byron.

Eastern Ontario Live Stock and Poultry Show: John Campbell, Woodville: W. A. Wallace, Kars; R. Richardson, South March.

Winnipeg Industrial: F. W. Brown, Portage la Prairie, Man.; Geo. Allison, Burbank, Man.

EXPERT JUDGES FOR SHEEP FOR 1907.

Cotswolds: T. Hardy Shore, Glanworth; R. Miller, Stouffville; S. J. Lyons, Norval; Val. Fitcht, Oriel; Jas. Underhill, Claremont; F. Bonnycastle, Campbellford; Prof. G. E. Day, Guelph; Geo. Green, Fairview; J. C. Snell, London; John Rawlings, Ravenswood; Wm. Thompson, Uxbridge; John Park, Burgessville.

Toronto: T. Hardy Shore, Glanworth; Val. Fitcht, Oriel.
London: S. J. Lyons, Norval; Val. Fitcht, Oriel.
Ottawa: Jas. Underhill, Claremont; F, Bonnycastle, Campbellford.
Chicago: Prof. G. E. Day, Guelph; Robert Miller, Stouffville.

Leicesters: R. J. Garbutt, Belleville; Jas. Fennell, Bradford; H. B. Jeffs, Bond Head; A. E. Archer, Warwick; Geo. Whitelaw, Guelph; T. Hardy Shore, Glanworth; Abraham Easton, Appleby; E. Wood, Appleby; Wm. Parkinson, Eramosa; E. Parkinson, Eramosa; John Orr, Galt; Wm. McIntosh, Burgoyne; R. Eastwood, Mimico; John Kelly, Shakespeare; Andrew Thompson, Fergus; J. K. Campbell, Palmerston; J. C. Snell, London; G. B. Armstrong, Teeswater; John Gibson, Denfield; C. E. Wood, Freeman; Jos. Gaunt, St. Helen's; J. M. Gardhouse, Weston; And. Whitelaw, Guelph; Wm. Whitelaw, Guelph; R. G. Martin, Marysville; A. W. Smith, Maple Lodge; H. G. Arnold, Maidstone; Prof. Craig, Ames, Ia.; John Marshall, Cass City, Mich.; J. W. Murphy, Cass City, Mich.; Prof. Curtis, Ames, Ia.; Geo. Penhale, Exeter; Prof. G. E. Day, Guelph; M. Kennedy, Northwood; D. Lillico, Ayr; Jas. Douglass, Caledonia; Frank Shore, White Oak; John Gardhouse, Highfield; Wm. Beattie, Wilton Grove; A. J. McKay, Ailsa Craig; A. Hastings, Crosshill; J. Hastings, Crosshill; A. Deering, Crosshill.

Toronto: Robert Garbutt, Belleville; (Reserve) Jas. Douglas, Caledonia.
London: J. M. Gardhouse, Weston.
Ottawa: Wm. Whitelaw, Guelph.

DORSETS: John Kelly, Shakespeare; Robert Miller, Stouffville; J. M. Gardhouse, Weston; John Campbell, Woodville; J. G. Hanmer, Brantford; Prof. Curtis, Ames, Ia.; Thos. W. Hector, Springfield-on-Credit; G. P. Everett, Mt. Vernon; H. N. Gibson, Delaware; E. O. Denton, Somerset; N.Y.; G. McKerrow, Sussex, Wis.; John Jackson, Abingdon; Fred Silversides, Uxbridge; R. H. Harding, Thorndale.
Toronto: John Campbell, Woodville; A. S. Forster, Oakville.
London: J. G. Hanmer, Brantford; (Reserve) J. M. Gardhouse, Weston.

SOUTHDOWNS: John Jackson, Abingdon; W. H. Beattie, Wilton Grove; W. H. Gibson, Beaconsfield, Que.; N. H. Gibson, Delaware; Robert Miller, Stouffville; Geo. Telfer, Paris; J. G. Hanmer, Brantford; J. C. Duncan, Orchard Park, N.Y.; Robert McEwen, Byron; H. L. Compton, Monroe, Ohio; Frank Klienhientz, Madison, Wis.; Prof. G. E. Day, Guelph; James Telfer, Paris; George Allen, Paris; Fred Fawkes, Beaconsfield, Que.; Sam. Bradburne, Simcoe.

OXFORDS: Prof. G. E. Day, Guelph; John Harcourt, St. Ann's; Smith Evans, Guelph; Jas. Tolton, Walkerton; R. J. Hine, Dutton; Henry Arkell, Arkell; Wm. Dickson, Mildmay; J. H. Jull, Mt. Vernon; W. J. Arkell, Teeswater; John E. Cousins, Harriston; Arch. McKenzie, Corwhin; R. E. Birdsall, Birdsall; J. C. Cooper, Picton; Wm. Newman, Cherry Valley; Wm. Arkell, Teeswater; L. Parkinson, Eramosa; S. C. Ketchen, Bloomburg; W. Lee, Simcoe; Prof. M. Cumming, Truro, N.S.; Walter Elliott, Kelso.

HAMPSHIRES AND SUFFOLKS: R. Gibson, Delaware; Henry Arkell, Arkell; W. H. Beattie, Wilton Grove; James Bowman, Guelph; John Kelly, Sharespeare; Geo. L. Telfer, Paris; Prof. G. E. Day, Guelph; H. N. Gibson, Delaware; W. H. Arkell, Guelph; W. R. Bowman, Mt. Forest; John Campbell, Woodville; R. J. Stone, Stonington, Ill.; J. Milton, Marshall, Mich.; Harry Thornton, Warren, Ind.; Frank Klienhientz, Madison, Wis.
Toronto: H. S. Arkell, Guelph.
London: W. H. Beattie, Wilton Grove.
Ottawa: John Campbell, Woodville.

LINCOLNS: John Gardhouse, Highfield; Leonard Parkinson, Eramosa; Robert Robson, Ilderton; Joseph Patrick, Ilderton; E. Parkinson, Eramosa; Herbert Lee, Highgate; Hardy Shore, Glanworth; Prof. G. E. Day, Guelph; Andrew Whitelaw, Guelph; D. Campbell, Strathburn; John T. Gibson, Denfield.
Toronto: John Gardhouse, Highfield.
London: D. Campbell, Strathburn.
Ottawa: Leonard Parkinson, Eramosa.

SHROPSHIRES: W. H. Beattie, Wilton Grove; R. Miller, Stouffville; J. G. Hanmer, Brantford; J. Campbell, Woodville; D. G. Hanmer, Burford; W. G. Pettit, Freeman; D. J. Campbell, Woodville; H. N. Gibson, Millbrook, N.Y.; Geo. Hindmarsh, Ailsa Craig; C. W. Gurney, Paris;

J. Miller, Brougham; H. Hanmer, Burford; J. C. Duncan, Orchard Park, N.Y.; Prof. G. E. Day, Guelph; Arthur Barnett, Brooklin; J. Shields, Caistorville; Geo. Crawford, Minesing; John Jones, Burford; W. D. Monkman, Bond Head; Will Dryden, Brooklin.

Toronto: H. S. Arkell, Guelph. (Reserve.) H. N. Gibson, Millbrook, N.Y. (Reserve.) W. H. Beattie, Wilton Grove.

London: W. G. Pettit, Freeman. (Reserve.) H. S. Arkell, Guelph.

Ottawa: D. G. Hanmer, Burford.

Provincial Winter Fair: J. C. Duncan, Orchard Park, N.Y. (Reserve.) J. G. Hanmer, Brantford.

DIRECTORS' MEETING.

A meeting of the directors of the Dominion Sheep Breeders' Association was held in the Palmer House, Toronto, on February the 23rd, 1907, at 10.30 a.m. The President, J. M. GARDHOUSE, occupied the chair.

Moved by Col. MCCRAE, and seconded by JOHN KELLY, "That clauses 2, 9 and 15 of our Constitution be amended to conform to the new regulations of the Act respecting Agricultural societies, viz., after the second word in the third line of clause 2 add "and three general directors;" after the sixth word in the first line of clause 9 strike out the words "President, Vice-President and;" clause 15 shall be added to by these words "At the first meeting of the Board of Directors following each annual meeting, a President and a Vice-President shall be elected." Carried.

Moved by Col. MCCRAE, seconded by Mr. HARDING, "That this Association affiliate with the National Live Stock Association." Carried.

The meeting then adjourned.

(A list of members of the Dominion Sheep Breeders' Association is published in the appendix to this Report.

DOMINION SWINE BREEDERS' ASSOCIATION.

ANNUAL MEETING.

The annual meeting of the Dominion Swine Breeders' Association was held at the Palmer House, Toronto, on February the 6th, 1907, at 9.30 a.m.

The President, R. H. HARDING, occupied the chair.

In the course of a few remarks, the President congratulated the members on the large representation present, and the healthy condition of the swine industry as hogs were selling around 7 cents per pound, and the market had been practically up to that mark the whole year round, which was very encouraging to the breeders of swine. He stated that what was a benefit to the bacon hog industry was also a benefit to the breeder of pure-bred hogs, and the outlook was certainly very bright for a good market for the coming year.

DIRECTORS' REPORT.

The secretary read the following report as submitted by the directors:

RECORDS. The number of registrations in 1906 is, at least, one-half larger than in 1905. The following is a general statement as to the registrations:

	Registrations.	Transfers.	Duplicate Certificates.	New Certificates.	Ancestors.	For Books Sold.	Membership.	Refunds.
January	253	35	..	..	....	.....	$84 00	$ 2 00
February	452	44	..	..	....	.....	78 00	......
March	507	92	..	..	....	.....	122 00	30 15
April	303	54	..	..	....	$2 75	......	......
May	472	31	6	..	58	.....	58 00	3 50
June	514	33	2	..	66	.....	58 00	2 85
July	657	22	4	3	93	.....	56 00	17 25
August	690	55	4	..	71	.....	64 00	18 50
September	692	39	3	..	117	.....	70 00	29 75
October	599	22	14	2	9	.....	14 00	3 00
November	559	49	5	..	....	.....	42 00	8 15
December	517	57	1	..	8	.....	46 00	4 50
	6,215	533	39	5	422	$2 75	$692 00	$119 65

The statement of registration according to the Provinces is as follows:

Province.	Registrations.	Transfers.	Duplicate Certificates.	New Certificates.	Ancestors.
Ontario	3,933	320	26	2	5
Manitoba	654	89	3	..	..
Saskatchewan	165	13	1	..	6
Alberta	147	9	4	..	..
British Columbia	88	20	1	..	..
Quebec	1,030	75	2	..	399
New Brunswick	99	1	2	..	12
Nova Scotia	26	1	..	3	..
Prince Edward Island	50	5	..	..	..
United States	23	..	..	..	..
	6,215	533	39	5	422

The number of pedigrees for the different breeds to be published in Volume 17 of the Record is as follows:

Berkshires..............	2,176	Poland Chinas...........	80
Yorkshires..............	3,574	Duroc Jerseys...........	23
Chester Whites.........	683	Tamworths..............	535

The monthly receipts on account of the swine records at Ottawa are as follows:

To December 31st, 1905.....	$1,903 30
January, 1906..........	302 40
February, 1906.........	347 80
March, 1906............	364 80
April, 1906..............	240 75
May, 1906..............	338 00
June, 1906..............	381 00
Forward..................	$3,878 05

Forward...........	$3,878 05
July, 1906..............	434 05
August, 1906............	479 75
September, 1906.........	471 50
October, 1906...........	398 95
November, 1906.........	380 90
December, 1906.........	353 30
	$6,396 50

Swine Memberships. In the last annual report of the Directors there was printed a copy of a resolution passed at a meeting of the General Breeders' Association of Quebec, asking that the membership fees of the Dominion Swine Breeders' Association, from swine breeders in Quebec, should remain the property of the Quebec Association, and that the net profits from registering swine from the Province of Quebec be annually returned to the said Provincial Association.

The Executive of the Dominion Swine Breeders' Association, to whom the matter was referred, made the following recommendation, which was approved by the Directors:

"In the Provinces in which there is an Association to look after the swine interests of that Province, the membership to the Dominion Swine Breeders' Association should be paid to the Secretary of that Association, either directly or through the Secretary of the Provincial Association, and that every three months the membership fees should be returned to these Provincial Associations; and at the end of each year, after deducting general expenses, including copy of printed volume of the Record, the profits should be equitably divided among the Provincial Associations. In the case of Provinces in which there is no Association to look after the interests of swine, the profits accruing from the registrations and memberships will be spent in the interest of the swine industry in these Provinces, as may be decided annually until a Provincial Association is formed."

Division of Surplus Money. At the last Annual Meeting it was ordered that $2,000 of the surplus fund then on hand should be distributed to the various Provinces, as follows:

Ontario.....................	$1,400 00	Nova Scotia..................	$15 00
Quebec.....................	140 00	New Brunswick..............	20 00
Manitoba..................	285 00	Prince Edward Island.........	20 00
British Columbia..........	40 00	North-West Territories...... ..	80 00

Of the $1,400.00 to Ontario, $500.00 was held back for future distribution, and the balance was voted as follows:

Provincial Winter Fair	$200 00
Canadian National Exhibition	300 00
Western Fair, London	150 00
Central Canada Exhibition, Ottawa	150 00
Eastern Ontario Live Stock and Poultry Show	100 00
	$900 00

The grants to Associations in Provinces, other than Ontario, were paid as follows:

F. M. Logan, Sec. Stock Breeders' Association, Victoria, B.C.	$40 00
C. W. Peterson, Sec. Stock Breeders' Association, Calgary, Alta.	40 00
G. W. G. Wright, Sec. Stock Breeders' Association, Regina, Sask	40 00
G. H. Greig, Sec. Sheep and Swine Breeders' Association, Winnipeg, Man	285 00
E. B. Elderkin, President Stock Breeders' Association, Amherst, N.S.	55 00

In accordance with the decision regarding the distribution of memberships and the profits from registrations, the payments to the various Provinces for 1906 would be as follows:

Province.	No. of Members.	No. of Registrations.	Amount of Membership.	Profits from Registrations.	Total Refund.
Ontario	240	3,933	$480 00	$1,076 22	*$1,556 22
Quebec	90	1,030	180 00	281 84	*461 84
Maritime Provinces	14	175	28 00	47 89	75 89
Manitoba	66	654	132 00	178 96	310 96
Saskatchewan	25	165	50 00	45 15	95 15
Alberta	12	147	24 00	40 22	64 22
British Columbia	10	88	20 00	24 09	44 09

It is recommended that before the profits accruing to each provincial association is paid, a report as to how the funds for the previous year have been expended by the provincial association should be supplied this Association, and it is further recommended that the profits from the Ontario work, $1,556.22, should be spent as follows:

(1) That the Ontario Yorkshire Breeders' Society should be paid the profits from the Ontario Yorkshire registrations, amounting to $750.

(2) That the balance of the profits for Ontario should be paid in grants to Fair Associations as follows:

(*a*) The Provincial Winter Fair	$200 00
(*b*) The Canadian National Exhibition	250 00
(*c*) The Western Fair, London	100 00
(*d*) Eastern Ontario Live Stock and Poultry Show	100 00

Provided that these Fair Associations contribute towards the prizes for swine at least as much as was contributed in 1906.

(3) To the Central Canada Exhibition, Ottawa, $250, made up of $150 offered in 1906 and $100 of the amount for distribution this year. Provided that Association makes the total classification for swine for 1907, including the Swine Breeders' Association grant, $1,017.

Provided further that the prizes for Yorkshire classess at these shows should not be increased out of these grants.

ONTARIO PROVINCIAL WINTER FAIR. The swine exhibit at the Winter Fair of 1906 was a very large one, there being fully one-third more entries than the year before. The following table shows the number of entries in 1906 in the different classes, together with the amount of prize money offered and won:

Class.	No. of Entries.	Prizes Offered.	Prizes Paid.
Berkshires	77	$159 00	$159 00
Yorkshires	56	159 00	159 00
Tamworths	42	159 00	159 00
Chester Whites	32	129 00	129 00
Grades and Crosses	44	120 00	120 00
Bacon Hogs	88	510 00	510 00

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*In addition to these amounts, there is $650 for Ontario and $140 for Quebec, on account of the division of funds made last year.

EASTERN ONTARIO LIVE STOCK AND POULTRY SHOW.—The statement below shows the number of entries, the prizes offered, the prizes won in each class of swine at the Eastern Ontario Live Stock and Poultry Show of 1906.

Class.	No. of Entries.	Prizes Offered.	Prizes Won.
Berkshires	10	$80 00	$68 00
Yorkshires	23	80 00	80 00
Tamworths	17	80 00	80 00
Grades and Crosses	37	80 00	80 00
Bacon Hogs	51	370 00	370 00

FINANCIAL STATEMENT.

To the 31st January, 1907.

RECEIPTS.	
Cash on hand	$2,385 34
Members' fees	914 00
Overpaid to Record Board, 1905	171 72
Registration fees	3,740 55
Interest	39 30
Sale of Records	8 25
Miscellaneous	0 75
Total	$7,259 91

EXPENDITURES.	
Grants to other societies, fairs	$1,095 00
Directors' fees and expenses	75 61
Postage and stationery	1 00
Printing	1,000 22
Telegraph and telephone	1 92
Delegates to Fair Boards	20 00
Refund of Record fees	143 43
Fees to Quebec Association	60 00
Levy of Record Committee	1,000 00
Auditor	2 00
Auditing Records	16 00
Miscellaneous	6 02
Total	$3,421 20
Balance on hand	$3,838 71

Examined and found correct,
this 1st day of February, 1907.

(Signed) J. M. DUFF, *Auditor.*

All of which is respectfully submitted.

R. H. HARDING, *President.*
D. C. FLATT, *Vice-President.*
A. P. WESTERVELT, *Sec.-Treasurer.*

RESOLUTIONS.

The report of the Directors was discussed and on motion of J. E. BRETHOUR, seconded by H. B. JEFFS, it was adopted.

Moved by H. B. JEFFS, seconded by WM. JONES, "That the question of changing the Constitution to comply with the new Ontario Act be left in the hands of the Directors, with power to make the suggested change." Carried.

Mr. BRETHOUR stated that after the change in the Constitution more directors would probably be required, and he thought it would be advisable to nominate two additional General Directors. R. H. Harding and D. C. Flatt were therefore nominated as General Directors.

Mr. DANIEL DECOURCEY suggested that a resolution be passed asking the Toronto Industrial for a larger grant towards the Swine class designated as "Other Distinct Breeds." He stated that at present the prizes were not large enough to induce breeders to bring out exhibits, and he for one would not exhibit if the prizes in this class were not increased.

Moved by George Green, seconded by W. H. Durham, "That this Association recommend to the Toronto Exhibition Association through the Secretary, as well as through their representatives, that the class for "Other Distinct Breeds" be placed on a par with the Berkshire and Yorkshire classes, as far as the prize list is concerned." Carried.

It was moved by Thos. Teasdale, seconded by John Boyes, Jr., "That this Association urgently recommend to the Toronto Industrial Fair Board that the judging of swine be commenced on Friday of the first week of the Fair." Carried.

Moved by Herbert German, seconded by A. C. Hallman, "Whereas the Yorkshire and Tamworth hogs have been judged by the same judges at the Canadian National Fair, and that the Tamworths have not been judged until Wednesday of the second week, Resolved that the Tamworths be judged separately from the Yorkshires and by judges suggested by the Tamworth breeders and that they be judged the first week of the Fair, and that the Swine Breeders' representative be instructed to present this resolution to the Canadian National Fair Board." Carried.

J. E. Brethour moved, seconded by Wm. Jones, "That the Dominion Swine Breeders' Association affiliate with the National Live Stock Association, and that the Secretary be instructed to make application for affiliation." Carried.

OFFICERS FOR 1907.

President	R. H. Harding, Thorndale.
Vice-President	D. C. Flatt, Millgrove.
Secretary-Treasurer	A. P. Westervelt, Toronto.
Registrar	J. W. Nimmo, Ottawa.

Directors.

Berkshires	W. H. Durham, Toronto.
Yorkshires	J. E. Brethour, Burford.
Chester Whites	D. DeCourcey, Bornholm.
Poland Chinas	Wm. Jones, Zenda.
Duroc Jerseys	W. M. Smith, Scotland.
Tamworths	J. C. Smith, Hintonburg.
Essex	Jos. Featherston, Streetsville.
General Directors	D. C. Flatt, Millgrove. R. H. Harding, Thorndale. Thos. Teasdale, Concord.
Ontario Agricultural College	Prof. G. E. Day, Guelph.
Dominion Live Stock Commissioner	Dr. Rutherford, Ottawa.
Auditor	J. M. Duff, Guelph.

Representatives to Fair Boards.

Toronto Industrial: D. C. Flatt, Millgrove; Major G. B. Hood, Guelph.

Ottawa: Robert Clark, Ottawa; D. Barr, Jr., Renfrew.

London: Geo. Green, Fairview, D. DeCourcey, Bornholm.

Peterborough: Robert Vance, Ida.

Guelph: G. B. Hood, Guelph.

Belleville: T. J. Hurley, Jr., Belleville.

Kingston: R. J. Garbutt, Belleville.

Provincial Winter Fair: Prof. G. E. Day, Guelph; G. B. Hood, Guelph; Wm. Jones, Zenda.

Winnipeg: And. Graham, Pomeroy, Man.; J. A. McGill, Neepawa, Man.

Eastern Ontario Live Stock and Poultry Show: R. H. Harding, Thorndale; P. O. Collins, Bowesville; J. C. Smith, Hintonburg.

EXPERT JUDGES FOR SWINE FOR 1907.

Berkshires: Wm. Wilson, Snelgrove; J. C. Smith, Hintonburg; X. Plaunt, Northcote; Samuel Dolson, Alloa; Hugh G. Clark, Georgetown; P. W. Boynton, Dollar; Alex. Smith, Maple Lodge; Wm. Jones, Zenda; W. G. Cavan, East Toronto; Jas. McEwen, Kertch; John Boyes, Jr., Churchill; Henry Jones, Zenda; H. J. Davis, Woodstock; J. C. Snell, London; Thos. Teasdale, Concord; Geo. Green, Fairview; Robert Vance, Ida; T. A. Cox, Brantford; Jas. Quirie, Delaware; Jos. Featherston, Streetsville; C. R. Decker, Chesterfield; Chas. Youngs, Brooksdale; D. DeCourcey, Bornholm; R. H. Harding, Thorndale; Jos. Barnett, Brooklin; E. E. Martin, Canning; H. B. Jeffs, Bond Head; Wm. Linton, Aurora; E. Brien, Ridgetown; G. B. Hood, Guelph; J. E. Brethour, Burford; Alex. Hart, Hampstead; W. A. Shields, Milton; D. J. Gibson, Bowmanville; S. J. Lyons, Norval; A. Johnston, Greenwood; C. C. McAvoy, Atha; J. L. Clark, Norval; Aiken Dolson, Alloa; John Watkins, Norval; D. C. Flatt, Millgrove; W. H. Durham, Toronto; Wm. Hartley, Alloa; John Bright, Myrtle; Frank Teasdale, Concord; Douglas Thomson, Woodstock; J. Weir, Northfield Centre.

Toronto: S. J. Lyons, Norval; E. E. Martin, Canning. (Reserve) Robert Vance, Ida.

London: Samuel Dolson, Alloa. (Reserve) T. A. Cox, Brantford.

Ottawa: T. A. Cox, Brantford. (Reserve) John Kelly, Shakespeare.

Guelph: W. G. Cavan, Toronto. (Reserve) H. G. Clark, Georgetown.

Yorkshires and Tamworths: David Barr, Jr., Renfrew; E. A. Kipp, Chilliwack, B.C.; Jas. Bray, Longburn, Man.; Lou Rogers, Weston; Geo. D. Betzner, Copetown; R. J. Kerr, Mimosa; W. R. Bowman, Mount Forest; Wm. Jones, Zenda; R. J. Garbutt, Belleville; R. H. Harding, Thorndale; N. M. Blain, St. George; J. H. Simonton, Chatham; G. North, Marden; A. Elliott, Galt; L. F. Master, Haysville; A. C. Hallman, Breslau; D. G. Hanmer, Burford; John Nichol, Hubrey; J. E. Brethour, Burford; A. Laurie, Wolverton; Wm. Davies, Toronto; Richard Gibson, Delaware; Henry Dedels, Kossuth; G. B. Hood, Guelph; F. Shore, White Oak; Jos. Featherston, Streetsville; H. E. Sharp, Ida; A. F. McGill, Hillsburg; J. M. Hurley, Belleville; Geo. Gier, Grand Valley; Jas. Stephen, Trout River, Que.; R. McCulloch, Harriston; Jos. Fletcher, Oxford Mills; Robert Nichol, Brussels; A. F. Foreman, Collingwood; Jas. Leach, Toronto; Wm. Howe, North Bruce; Prof. G. E. Day, Guelph; H. J. Davis, Woodstock; D. C. Flatt, Millgrove; W. R. McDonald, Ridgetown; W. Elliott, Galt; R. G. Martin, Marysville; J. E. Cousins, Harriston; Geo. Green, Fairview; J. W. Callbeck, Augustine Cove, P.E.I.; J. G. Clark, Ottawa; J. C. Smith, Hintonburg; D. Drummond, Ottawa; H. B. Jeffs, Bond Head; And. Graham, Pomeroy, Man.; A. Carey, Millgrove; Jas. Yule, East Selkirk; A. W. Ross, Bromley; J. J. Pearson, Cooksville;

R. F. Duck, Port Credit; Duncan Anderson, Rugby; Thos. Hurley, Belleville; J. H. Grisdale, Ottawa; A. A. Colwill, Newcastle; M. Cumming, Truro, N.S.; R. O. Morrow, Hilton; Geo. Douglas, Mitchell: Jas. Douglas, Mitchell; A. P. Ketchen, Regina, Sask.; W. A. Trann, Cedar Grove; P. O. Collins, Bowesville; L. Foster, Myrtle; J. G. Foster, Myrtle; J. R. Flatt, Millgrove; J. Duck, Port Credit; Ken. Featherston, Streetsville; W. J. Black, Winnipeg, Man.; A. B. Potter, Montgomery, Sask.; Herbert German, St. George; M. Wilson, Fergus; D. Currie, Morriston; Gus. A. Langelier, Quebec; Richard Birch, Anderson.

Toronto: Yorkshires—Wm. Jones, Zenda; R. J. Garbutt, Belleville. Tamworths—A. C. Nichol, Hubrey. Bacon Hogs—Wm. Jones, Zenda; R. J. Garbutt, Belleville; A. C. Nichol, Hubrey.

London: A. C. Hallman, Breslau; (Reserve) G. B. Hood, Guelph.

Ottawa: D. C. Flatt, Millgrove.

Guelph: Wm. Jones, Zenda; A. C. Hallman, Breslau. Bacon Hogs—R. J. Garbutt, Belleville; Prof. G. E. Day, Guelph. (Reserve) Wm. Jones, Zenda.

Essex: H. G. Clark, Georgetown; G. B. Hood, Guelph; R. J. Garbutt, Belleville; R. H. Harding, Thorndale; Wm. Jones, Zenda; Jas. Main, Milton.

Duroc-Jerseys: D. C. Flatt, Millgrove; D. DeCourcey, Bornholm; G. B. Hood, Guelph; Geo. Green, Fairview; Wm. Jones, Zenda; J. E. Brethour, Burford; R. H. Harding, Thorndale; W. M. Smith, Scotland; Geo. Bennett, Charing Cross; Jos. Featherston, Streetsville; W. Wilson, Snelgrove; Prof. G. E. Day, Guelph; Jos. McGarvin, Chatham; W. N. Tape, Bentpath.

Poland Chinas: Jos. Featherston, Streetsville; D. DeCourcey, Bornholm; Geo. Green, Fairview; Wm. Jones, Zenda; W. M. Smith, Scotland; R. H. Harding, Thorndale; R. Willis, Glen Meyer; Prof. G. E. Day, Guelph.

Chester Whites: E. D. George, Putnam; R. E. Birdsall, Birdsall; Albert Barachy, Bloomington; Wm. Jones, Zenda; J. C. Snell, London; Geo. Green, Fairview; D. DeCourcey, Bornholm; R. H. Harding, Thorndale; G. B. Hood, Guelph; Gideon Snyder, Jarvis; Jos. Featherston, Streetsville; G. Bennett, Charing Cross; J. E. Brethour, Burford; J. C. Nichol, Hubrey; Prof. G. E. Day, Guelph; W. E. Wright, Glanworth; Robert Clark, Ottawa; D. C. Flatt, Millgrove; Geo. Douglas, Mitchell; J. C. Smith, Hintonburg; R. J. Garbutt, Belleville.

London: D. C. Flatt, Millgrove; G. E. Day, Guelph.

Toronto: If Chester Whites are shown by themselves, G. B. Hood, but if breeds are shown together R. J. Garbutt, Belleville.

Ottawa: Jos. Featherston, Streetsville; G. B. Hood, Guelph; J. E. Brethour, Burford.

Guelph: G. B. Hood, Guelph.

DIRECTORS' MEETING.

A meeting of the directors of the Dominion Swine Breeders' Association, was held at the Palmer House, Toronto, on Saturday, February the 23rd, at 1.30 p.m.

Following the instructions of the annual meeting of the Swine Breeders' Association, the following changes were suggested by the Secretary, in the Constitution, to comply with the revision of the Act under which the Association is incorporated:

1. That "and three general directors" should be added after "established breeds" in the third line of clause 2.

2. The following words should be taken out of clause 9. "President, Vice-President and."

3. That the following should be added to clause 15, "At the first meeting of the Board of Directors following each annual meeting, a President and Vice-President shall be elected."

It was moved by Prof. DAY, seconded by THOS. TEASDALE, "That clauses 2, 9 and 15 of our Constitution be amended to conform with the new regulations of the Act respecting Agricultural Societies." Carried.

It was moved by Prof. DAY, seconded by J. C. SMITH, "That the nominees of the annual meeting for general directors be confirmed." Carried.

Moved by Prof. DAY, seconded by WM. JONES, "That Jos. Featherston of Streetsville, and J. E. Brethour of Burford, be delegates to the National Record Board." Carried.

The meeting then adjourned.

(A list of members of Dominion Swine Breeders' Association is published in the appendix to this Report.

WESTERN ONTARIO POULTRY ASSOCIATION.

ANNUAL MEETING.

The annual meeting of the Western Ontario Poultry Association was held in the City Hall, Guelph, on Thursday, December 13th, 1906, at 1.30 p.m. The President, Wm. McNeil, in the chair.

It was moved and seconded that the minutes of the last meeting be taken as read. Carried.

The financial statement was read and on motion was accepted.

Moved by Wm. Barber, seconded by Mr. Spry, "That Mr. Westervelt, the Secretary, write to the Secretary of the Canadian National Exhibition to see if this Association can get an additional delegate on the Toronto Fair Board." Carried.

Several members spoke of the crowded condition of the poultry department which necessitated coops being placed where the light was not good.

OFFICERS FOR 1907.

Hon. President	Dr. A. W. Bell, Winnipeg, Man.
President	Wm. McNeil, London, Ont.
1st Vice-President	Allan Bogue, Woodbank.
2nd Vice-President	W. J. Bell, Angus.

Directors.

L. H. Baldwin, Deer Park.
A. W. Tyson, Guelph.
G. G. Henderson, Hamilton.
T. H. Scott, St. Thomas.
P. Grier, Owen Sound.
R. Oke, London.
N. K. Cornwall, Thamesville.
C. H. Wilson, Hawkestone.

Representatives to Canadian National Exhibition:
Wm. McNeil, London. Wm. Barber, (2nd representative if two can be secured).

Representatives to Western Fair, London:
J. H. Saunders, London. C. A. Stewart, London.

Representatives to Brantford:
J. H. Minshall, Brantford. Wm. Ferguson, Brantford.

Representatives to Ontario Provincial Winter Fair:
Wm. McNeil, London. A. W. Tyson, Guelph.

Moved by Mr. Donovan, seconded by Mr. Bell, "That L. H. Baldwin and W. J. Bell be two additional representatives to the Winter Fair Board if four can be secured." Carried.

The directors were asked to consider the appointment of Mr. N. Cosh as judge of Minorcas.

The meeting then adjourned.

FINANCIAL STATEMENT.

For Year ending October 31, 1906.

RECEIPTS.		EXPENDITURES.		
Membership Fees	$276 00	Balance due Treasurer as per last report	$991 51	
Legislative Grant	1,021 25	Directors' Expenses	27 50	
		Memberships paid to Winter Fair	276 00	
		Interest on overdraft	29 74	
	$1,297 25			$1,324 75
		Balance due Treasurer		27 50

Examined and found correct this 13th day of Dec., 1906.
(Signed) J. M. DUFF, Auditor.

(Signed) WM. MCNEIL, President.
(Signed) A. P. WESTERVELT, Treasurer.

DIRECTORS' MEETING.

The new Board of Directors met immediately at the close of the annual meeting.

The following recommendations regarding the prize list were made to the Winter Fair Board:

That the following classes be added: Silver Pencilled Wyandottes, Brahma Bantams, African Geese, Guinea Fowl (in pairs).

That the class of Rhode Island Reds be divided making a class each for Single Comb and Rose Comb.

That the class of Orpingtons, A. O. C., be changed to read Orpingtons, White. Varieties of Orpingtons not classified to show in A. O. V. Fowl Class.

Mr. Scott suggested that the coops for turkeys, geese and ducks should be raised at least 18 inches from the floor.

The directors spoke of the need for accommodation in the Winter Fair building for Specialty Club meeting, etc.

APPOINTMENT OF JUDGES

Plymouth Rocks: P. SCHWAAB, Rochester, N.Y.

Leghorns and Buff Orpingtons: R. OKE, London.

Minorcas, Spanish, Black and White Orpingtons: N. COSH, Port Dover.

Wyandottes and Rhode Island Reds: JAS TUCKER, Concord, Mich.

Game, Game Bantams, and Ornamental Bantams: S. BUTTERFIELD, Windsor.

Asiatics and Hamburgs: WM. MCNEIL, London.

Polands, Javas, Red Caps, Dorkings, Silkies, Sultans, Dominiques, Andalusians and A. O. V. Fowls: L. G. JARVIS, Montreal.

Turkeys, Geese and Ducks: A. THOMPSON, Allan's Corners, Que.

Pigeons: C. F. WAGNER, Toronto.

Ornamentals: WM. BARBER, Toronto.

Utility Pen and Dressed Poultry: WM. BARBER, Toronto, and W. R. GRAHAM, Guelph.

Moved by W. J. Bell, seconded by A. W. Tyson, "That in future no scoring shall be done for exhibitors by the Association." Carried.

It was decided that late entries must be post-marked at Toronto not later than the second Saturday before the opening of the Fair.

The closing dates for regular contributions to the Special Prize List shall be October 15th, 1907. Late contributions shall amount to at least $2 and shall be received by the Secretary at least three days before the opening of the Fair.

Moved by W. J. Bell, seconded by L. H. Baldwin, "That a small plain white card be attached to each special prize ribbon to show what the special is for." Carried.

(A list of members of the Western Ontario Poultry Association is published in the appendix to this Report.

EASTERN ONTARIO POULTRY ASSOCIATION.

ANNUAL MEETING.

The annual meeting of the Eastern Ontario Poultry Association was held in the Imperial Building, Ottawa, on Wednesday, March 6th, 1907, at 7.30 p.m. The President, Mr. John A. Belford, in the chair.

In a few remarks the President reviewed the work of the past year and then called on the Secretary to read the financial statement.

Upon motion, the financial statement be adopted.

A revision of the prize list was then taken up and the following recommendations were made to the Executive of the Eastern Ontario Live Stock and Poultry Show: "That the following classes be added: Black Wyandottes, Black Tailed Japanese Bantams and Narragansette Turkeys."

"That the class for China Geese be made into two classes one for Brown China Geese and one for White China Geese."

It was decided that it would be advisable to have a section for A.O.V. Fowls added to the Sale Class.

The following changes were suggested for Pigeons:

"That there be one class for Carriers instead of two."

"That there be one class for Trumpeters instead of two."

"That Oriental Frills be struck out."

"That there be one class for Show Homers instead of two."

"That the class for "Magpies, Black, Red or Yellow" be divided to make a class for Magpies Black, another for Magpies Red, and that Yellow Magpies show in the class for Magpies, A.O.C."

"That the class for Nuns be divided, making a class for Nun, Black, and another for Nun, A.O.C."

"That classes be added for Owls, African, White, and Ice Pigeons."

The prize list as amended was on motion adopted.

The following judges were nominated for the next show: Wm. McNeil, London; Sharp Butterfield, Windsor; L. G. Jarvis, Montreal; C. F. Wagner, Toronto.

Moved by Geo. Higman, seconded by J. H. Warrington, "That exhibitors coming a distance of 100 miles or over be allowed until 10 a.m. Tuesday to get their birds cooped. All other exhibitors to have their birds cooped by 10 o'clock Monday night." Carried.

OFFICERS FOR 1907.

Honorary Presidents	Lord Aylmer, Ottawa. Hon. Sydney Fisher, Ottawa.. Hon. Nelson Monteith, Toronto.
President	J. A. Belford, Ottawa.
Vice-President	Geo. Higman, Ottawa.
2nd Vice-President	W. H. Reid, Kingston.
Secretary-Treasurer	A. P. Westervelt, Toronto.

Directors:

J. H. Warrington, Cornwall.
F. J. Blake, Almonte.
W. M. Osborne, Brockville.
F. A. James, Ottawa.
W. F. Garland, Hintonburg.
A. W. E. Hellyer, Ottawa.
C. J. Daniels, Toronto.

Delegates.

Toronto Exhibition: C. J. Daniels, Toronto; A. W. E. Hellyer, Ottawa.

Central Canada, Ottawa: J. A. Belford, Ottawa; Geo. Higman, Ottawa.

Eastern Ontario Live Stock and Poultry Show: J. A. Belford, Ottawa; Geo. Higman, Ottawa; W. F. Garland, Hintonburg.

Auditor: J. M. Duff, Guelph.

Superintendent: R. E. McKinstry, Ottawa.

Financial Statement.

To January 31, 1907.

Receipts.		Expenditures.	
Members' fees	$109 00	Balance due treasurer as per last report	$757 89
Entry fees	597 15	Fees for entries and poultry memberships	763 90
Birds sold selling class	57 75		
Received from Eastern Show to cover overdraft	757 89		
	$1,521 79		$1,521 79

Examined and found correct
this 2nd day of March, 1907.
(Signed) J. M. Duff, Auditor.

(Signed) John A. Belford, President.
(Signed) A. P. Westervelt, Treasurer.

(A list of members of the Eastern Ontario Poultry Association is published in the appendix to this Report.

THE PROVINCIAL WINTER FAIR.

PUBLIC MEETING.

The City Hall, Guelph, was crowded to excess on Wednesday evening, December 12th, 1906, standing room only being available at an early hour. The Hon. Nelson Monteith, Minister of Agriculture for the Province of Ontario, occupied the chair and called the meeting to order promptly at 7.30.

During the evening an excellent programme of music was rendered under the direction of Captain T. E. Robson, London.

In the course of a few well chosen remarks the chairman said: "It is my pleasant duty to-night to preside, and I know there will be no necessity for any ruling from the chair with regard to order. We have always been accustomed to the best of order in this Hall, and I know that to-night will be no exception. We have with us a number of gentlemen who will be able to discuss the questions of the day as touching agriculture, and I therefore shall refrain from inflicting any remarks upon you at this juncture, but shall call upon his Honor, the Civic Representative, Mayor Sleeman.

ADDRESSES OF WELCOME.

Mayor SLEEMAN: I am pleased to be with you to-night, and to be able to extend to you a right royal welcome to our royal city. I hope no one has suffered any inconvenience for want of accommodation. I know it is the wish of the citizens that you should be made comfortable, and they will do all in their power to make you so. I am more than pleased at the rapid growth of your show. I think it was some fourteen years ago that I was one of a deputation that waited on the Agriculture and Arts Association in Toronto to try and secure this show for this city. After being shown the plans of the building that this city was supposed to provide we almost gave up hope, and we came to the conclusion that we could not provide that accommodation. However, your humble servant suggested that we might use the skating-rink, and I am pleased to say that it was accepted, and the fall of that year saw the building completed. I cannot but remark on the rapid increase of the show since that time. That building did good service for some time, but afterwards it became entirely inadequate. I am now led to believe that the building we now have is hardly sufficient for the accommodation required. I can only say that I hope you will not relax your efforts to make the show bigger, as I am satisfied additional accommodation will be forthcoming.

Mr. J. P. DOWNEY, M.P.P.: My task is rendered more easy to-night by the gracious welcome that has been extended to you by His Worship the Mayor. I can only supplement his observations by saying as representative of the great Riding of South Wellington—greater to-night because of its splendid record in the show ring during the past few hours—as the representative of that riding in the Legislature it gives me a great deal of pleasure, and as a citizen of Guelph also to repeat what His Worship has said to you that the citizens of Guelph and the people of the whole County of Wellington desire to make every man and woman that is attending this great agricultural convention this week feel perfectly at home.

I had encouraged myself in the belief the past few years that the City of Guelph had a monopoly in one or two things. I believe, Sir, we had reason to think we had a monopoly in pretty girls in this Province, but year after year this great Winter Fair is graced by the presence of some beauties from distant parts, and I have been shaken in that belief, and I have come to the conclusion that we have not got all the beauty in the City of Guelph.

I extend a welcome to the ladies who are here to-day, working to see if they cannot make life on the farm better educationally and socially, and I say God-speed them in the good work they have taken up; and on behalf of the allied Associations that have been behind this Winter Fair we welcome you to this Royal city of Guelph, founded by John Galt seventy-nine years ago last St. George's Day, eighty years ago on the 23rd next April. We welcome you to the Agricultural Capital of the great Dominion of Canada, the name this royal city has won because of the fact that this great Winter Fair is held here. We welcome you to the home of the Ontario Agricultural College, that institution which in the years gone by, has manned many agricultural colleges in the sister provinces of this Dominion, and agricultural colleges in the States to the south of us; that institution which has won for itself by its representatives such a high name at the great Live Stock Exhibition in the City of Chicago, where its students carried off ten prizes in cattle judging competition against representatives of all the agricultural colleges on this North American continent. We welcome you to this great industrial city of Guelph, the city of commercial enterprise, and the city of happy homes, and I may add, without egotism, of hospitable people. I ask you to make yourselves thoroughly at home. The latch-string is hung on the outside of the door of every house in Guelph; all you have to do is to knock and there will be a kindly word to walk in, take off your hat and make yourself at home.

G. C. **Creelman**, President, Ontario Agricultural College, Guelph: I have been looking about for a specially good reason why they should have put three persons on the programme to respond to the address of welcome, and after hearing the words of the Mayor and the address of welcome from the member for the Legislature, I have come to the conclusion that I was placed upon the programme to-night simply because I am the only man now living in the City of Guelph who is not directly responsible for this show being located here. I assure you we appreciate to the very fullest extent the manner in which you come, not the first year and the second year, but year after year to a purely educational institution, and here spend your days and dollars in getting what you can from an educational show such as the Provincial Winter Fair. We all appreciate the fact that a man will go to a show where there is something doing all the time in a vaudeville way, and where he is being entertained, but men and women in hundreds and thousands continue from year to year to come to this exhibition which has no claim to entertaining them except in an educational way.

I want to say a word for the Ontario Agricultural College. We welcome you to that institution; we could not get along without you. We have an institution there which is entirely dependent upon you and your families. As President I can say to you that my staff and members of the faculty could not draw our salaries if you were to withhold your support. Hence we appreciate to the fullest extent the fact that you see fit from year to year to send your boys and girls to the Ontario Agricultural College and its affiliated institution, the Macdonald Institute, to have them educated along practical lines. There are two things we are trying to do, one for the boys and one for the girls. We are trying to take your boy and make a man of him, and develop the brain power that is in him. We cannot take your boys and make good farmers of them, but if you will send us good farmers, then we will teach them how to do things in a more systematic and scientific way than they did before they came to us. We are trying to do a great deal more for the girls than we ever did before. There was a sentiment that prevailed in this country for a long time that mother could teach the girls all that was necessary for a girl to know about the things of this life. We did not look to the school to take hold of the girl and teach her those things which are necessary for every girl to know; we have not up to this time appreciated the necessity for giving the girls some special instruction along domestic lines. Now we have an institution that is practical; where a girl is required to do practical work, and when she goes home, instead of hanging her hat in the front hall and going into the parlor to play the piano, she will put on her apron and say, "Mother, I have learned some things in the Macdonald Institute that will help you to save steps and lighten your labor in the home." We ask you to come out and inspect the Institute, as well as the Ontario Agricultural College, and we will make you heartily welcome.

Replies to the Addresses of Welcome.

Arthur Johnston, President, Provincial Winter Fair: I am simply here for the purpose of expressing to the people of Guelph the feelings we have in regard to the treatment the Board and all connected with the Winter Fair received from the people of this city. On behalf of that institution I can say they appreciate to the fullest extent the fact that the people of Guelph have not only extended a welcome to the people who come to the Winter Fair, but they have supplemented that by very many kindnesses which are remembered gratefully, and many of us will remember them to the last day of our lives. There are a few facts I should like to mention with regard to the Exhibition. It was an inspiration to look at the vast concourse of people assembled there to-day without any hope of amusement, without any hope of social position, and without hope of anything but agricultural education. I may say the spirit of the show and the audience, and I have attended every exhibition for the last twenty-five years, never manifested one-tenth a part of the interest, nor have the crowds ever been so great. I can see a great future for this show at Guelph. It is going to tax the capacity of your city of Guelph to provide room, as this building will be utterly inadequate, and I am very glad the Minister of Agriculture is here to see the inadequacy of the accommodation.

John Gosling, Kansas City, Mo.: I am not a public speaker; I am simply a cattle man. The first employment of man was, to care for cattle, *i.e.*, he was given power over the beast of the field and field work. The whole population was then in it. I do not know whether you ever thought of that before. When I came to Guelph this week I wondered if everybody in Ontario was in it. To see the feeling that was shown at the show it seemed to me that you were,—that there was not any other business going on. If I had nothing to say before I came into the hall, after hearing such remarks from the speaker before me, I feel as if I could talk for five hours, and then go and sit and think about the rest all night. (Laughter.) President Creelman told you about what is going on at the College, and invited you to go and see. I want to extend that invitation a mile further, and beg of you to go. It is something wonderful up there, compared with what it was some years ago. The first time I met Dr. Mills at Ames, Iowa, he spoke about the germ how it had started, and how much it was appreciated. Some years ago I was called upon to examine the papers of seventeen students from five different colleges, on judging beef cattle, and the highest marks went to students who came from Canada. (Applause.) Where are they to-day? One occupies a Professor's chair in Ottawa, Canada,—Prof. Grisdale. Another occupies a chair in Dakota, and another at Ames, Iowa. This will show you that there is plenty of room on the top shelf. It was my ambition always to be somewhere near the top at whatever I tried to do. I could not stop short of being somebody, and that is the thing we want to-day injected into the heart of the boys. A Kansas boy, fourteen years of age, is at Upper Canada College, Toronto. I went to Toronto on Mondey last to see him, and I called up (by telephone) the preparatory school to arrange the time, thinking he was there; but he had passed on to the higher branch of study. He came down half an hour before the time fixed simply because he had got through his studies, and he said some of them would be half an hour behind. That is Kansas blood (Laughter); but his mother and father are Scotch. (Applause.) In Minnesota an Agricultural College student cannot get his diploma until he is able to slaughter and cut up a steer, a pig and a sheep intelligently; and if every boy who goes to this College could do that, you would be glad to let him help out with a great deal of the work in that line on the farm and do it with intelligence, and he could go and judge at a fair with intelligence, being fortified with the knowledge of points and composition of carcasses. When demonstrating we strip everything off the frame of an animal, and then we show the skeleton and show the parts where they were cut from, and place them back so that the student cannot forget which is the roll, and the round, the tender-loin, and so on. If he cannot learn in that way he had better stay at home.

ADDRESS.

By Hon. Nelson Monteith, Toronto.

I do not intend to inflict upon you a lengthy speech, but I desire to make a few remarks on matters that seem to press home upon me. This is the great agricultural event of the year. We have had all our other fairs, and they have been successful this year beyond measure, but this to my mind is the great event because the farmers of this province will gather here in such large numbers and spend several days in thoughtful consideration of the great possibilities of their calling. Agriculture is the great industry upon which the foundation of the success of this Province is built, and it is something that is of primary interest to every citizen throughout the length and breadth of Ontario. This is our own Ontario Provincial Winter Show, a show at which the cream of our beef cattle, sheep, swine and poultry is represented, products of which represent over fifty million dollars annually to the farmers of this Province. The ideal animal comes here and is judged, and you have an opportunity of seeing what can be produced in the several lines of live stock. It is perhaps unnecessary for me to impress upon this audience the necessity for high ideals, but there are a few other questions that possibly I should be recreant to my duty if I did not draw your attention to.

What makes for the uplift and furtherance of agriculture in this country? The one thing, I believe, that of all others will make for it at this period of our history, is that we have more enthusiasm in the work. Not that explosive enthusiasm, but that solid determination that means to put the agricultural interest above and beyond any other interest, and put it in its proper place in this great Province. The dignity of a calling is its utility, therefore what calling is of greater dignity than that of agriculture. Things are improving in this line to some extent; I feel when I go over the length and breadth of this great Province and come in contact with those engaged in agriculture that to be an agriculturist is no mean honor. We see before us at this convention comfortable, prosperous, progressive, intelligent and industrious people; people, alas, who are not increasing in numbers, and why so? We have a most dignified calling, yet our young men are deserting it and our young women are deserting it and going to the city, or going to the West. We need the boys and the girls on the farm, and we need them in our social system more than we ever did, to properly balance the great political system under which we live. There is a stability about the rural population; I do not say it in the way of flattery, but I say it because I believe it. Therefore, I say it is one of our first duties, as far as possible, to maintain this balance, and keep our boys and girls upon the farm, and make the conditions attractive there. I would go further and attract back from the city those who are longing for a broader and wider sphere to live in than the workshop. I think there are a great many branches of agriculture such as poultry raising and fruit raising that residents of the city might well come to the country and engage in profitably. I recognize that one of the great drawbacks to country life at the present time is lack of suitable and available labor to carry on the work; that is one of the things that is turning our farms into cattle-runs. I speak with a certain amount of feeling in this matter. We cannot hope at present to attract from the city labor to fill the gap, and we must look further afield, and the officers of the Department over which I have the honor to preside have been in some measure successful in bringing out numbers from the old land to this Province of Ontario. We are somewhat handicapped because everybody, apparently, at home and abroad is attracted by the vast possibilities of the West, and many of those that come to our Province get inoculated with that spirit and leave us and go West. Let us not forget that the possibilities for making headway in life are just as good in this Province of Ontario as in any other place (Applause); just as good as they ever are in the West, or ever will be. You hear of the men who succeed and make wealth, but do you hear of the men who fail? I believe it is one of our first duties to see to it that our farms are peopled, and that sufficient help is available to carry on the great work of agriculture. I can promise you that the Department of Agriculture and the Government itself is in duty bound to take up this matter and see it to a successful conclusion. It is our purpose during the coming year to put forth a greater effort than ever to attract to our beautiful Province the great tide of humanity that flows from the old land. We hope to be more successful than in the past; we hope to get a greater number of these who have a knowledge of agricultural methods to come and settle among us.

There are a few lines in which we have excelled ourselves. I believe co-operation is one of the great methods by which agriculture can be promoted and uplifted still more and more as the years go on. We co-operate in the dairy industry and in the fruit industry, and we might well do so in many other industries. Co-operation in the poultry industry would afford many advantages. We are living only to-day; to-morrow is not ours; yesterday has gone, and we sometimes put off, and say we will have these facilities in the days that are to be, but we are living to-day and we should have them now. The farmers of this Province are prosperous and they have much money. Why, therefore, should they deny themselves the advantages that would make life better worth living? The providing of better appliances in the home is one thing that we might well pay more attention to. The telephone, I believe will spread throughout this land, and I trust we shall before long have a rural mail delivery. (Applause.) These are the things that would tend to keep the boys and girls on the farm, and what better help can we get in the furtherance of this great calling of agriculture than those who have been born to it?

We are glad indeed to again assemble together at Guelph. It has ever been a pleasure to me to come to the Royal City, of which I have so many pleasant personal remembrances. For me there is something of sentiment attaching to Guelph, because of the fact that my father was here when Galt cut the first tree.

We have to-night with us a number of gentlemen who will address you, and I hope our meeting will be a pleasure, and that we shall all carry away with us the feeling that it has been good for us to be here. I hope during the continuance of this show you will still further avail yourselves of the opportunities it offers for enlightenment in this great calling of agriculture.

EDUCATION AND ENTHUSIASM.

By C. C. James, Deputy Minister of Agriculture, Toronto.

The keynote of my address to-night is "Education and Enthusiasm." If the Winter Fair, and all that belongs to it, stands for anything it stands for these two ideas, "Education and Enthusiasm;" and the moment we drop away from the educational idea, or the moment we lose in the enthusiasm that has been characteristic of these meetings, that moment the Winter Fair will begin to move on a down grade. Those of us who have any responsibility in connection with it, whether as members of the board or as officers, or as simply contributors to it, should ever keep that on thing in mind: and that is, that, judging from the past, the future of this Fair must be attained only by keeping in mind these two things: education of the right kind, and enthusiasm of the right kind.

At this time of the year, we have been accustomed to try and balance the books; to see whether any progress has been made; and whether there are any promises in the future for this great agricultural industry. Three or four months ago, I was invited by two prominent officials of one of our railways to meet them and discuss with them a very serious situation. I went to their office, and had a talk with them, and this was the question. "Do you know that the shipments of grain in this Province are falling off in a remarkably serious manner? We are not shipping the grain that we ought to ship; we are not getting the business that we ought to get. What has gone wrong with the agriculture of Ontario?" Why, nothing has gone wrong with it; everything is going right. Only a week or ten days ago members of the grain section of the Board of Trade of Toronto asked for an interview with the Minister who is our chairman to-night. What did these men tell us? Practically the same story: "We cannot get the grain. Grain is not to be had, yet your reports indicate that the farmers are growing more grain than ever. Something is wrong." Nothing is wrong, at all: everything is going right; and if we had these men here to attend the Winter Fair, and to listen to the lectures, that are being given, and to see you and talk with you, they would get the answer, and they would perhaps be convinced. What has been the mission of this Winter Fair? Going back as we do for the past fifteen years its mission has been to stop shipment of grain over the railroads of Ontario. The mission of this great Winter Fair has been more beef, more bacon, more mutton, more poultry, more butter and more cheese, and less wheat, less oats, and less barley to be sent off from the farms. And the fact that it has been brought home in a business way to the great railroad corporations, and to the men who make their living in the handling of grain in this country, is one of the strongest proofs that this Winter Fair has been accomplishing that purpose for which it was founded. The farmers are producing the grain, but instead of sending it from the farms, they are shipping from their farms the finished product such as you will see on exhibition. The old agriculture is gone; the new agriculture has come; and it is only when we look back, for perhaps forty or fifty years, that we realize what a wonderful change has come over the agriculture of this province. The change has been going on year by year,. We are not standing where we stood a year ago. Very important developments have taken place in the meanwhile. You say, "Is it now simply a question of beef, and bacon, and butter and cheese, and poultry? Is that now the object of the young man who is starting out as a farmer? Is that the whole problem? Has he simply to find out how he can best produce a pound of any one of these articles? Is that the whole scheme of agriculture?" Well, if any man sits down and satisfies himself in that easy way, he will soon find that the agricultural problem of to-day is far more complicated than that. We are not very far away from the time when agriculture in this country meant as large a number of bushels of wheat as possible, at as low a cost as possible, and the same with barley and oats, and hay; because in the United States these articles could be marketed and a certain amount of cash could be got; or articles could be taken to the store and changed for goods that each family required. It was then, a comparatively simple question. But now, it has become very much more complicated than that, and the young men who are fitting themselves for farm work in this country, should see to it that they get into their minds a clear comprehension of the greatness of the question as it is now presenting itself. Agriculture is becoming one of the most complicated questions for solution that we have in this country. It is a comparatively easy matter for one of the manufacturers in this city of Guelph who is producing one line of goods, to know what he is doing. He has the market price, and the price of labor and material, and he can work out that problem from the start to finish easily, in comparison to the problem which is presenting itself to the farmer to-day. There is not a man, producing in this Province to-day, who has so complicated and difficult a question to solve as the farmer. The young man who wishes to set himself right, should begin at once to carefully study those other elements which are beginning to enter in, and which complicate still more the question.

I have here four items which it seems to me in the near future will still more seriously complicate the great question of production by the farmers of this country. For instance, there is going on in a number of the countries of the world to-day, a production of gold to an enormous extent. Every country that has been known to produce gold is being worked to a far greater extent than before. The gold production of the world is increasing enormously. This increase in the next few years is going to have a very important effect upon the price of other products; and that is a point that the farmers, who have the most important products in this country, should carefully understand. Is the production of gold in countries going to increase rapidly enough to cause a rise in the farmer's products? Follow that out, and see if it has not a bearing on the farmer's products.

The next question that is coming directly home to us in this country is the wonderful development of transportation facilities. The last time I addressed the Winter Fair, I made some reference to the great trans-Continental road that was then, so to speak, in the air. It is now to a large extent upon the earth, and instead of one new road we have two. You cannot build a trans-Continental railway from the Atlantic to the Pacific, without its having some very important effect upon the farm owned by every individual before me to-night. In addition the roads that we have here now, are sending out their branches in all directions. That is an element that has to be carefully considered. It is going to have an effect upon the agriculture of this country. What that effect will be, I am not going to prophesy.

The next is the development of cheap electric power all over this Province. Do you mean to say that is going to affect only the city of Guelph, and Stratford, and Hamilton, and Brantford, and London? If that is all the good it is going to do, then I doubt very much if we are doing our full duty to this Province. The farmers of this country have as much interest in cheap power as anybody else. There is going to be a general distribution of this power throughout the eastern and western portion of this Province. Are you not going to be affected by it? It may be, that within four or five years, you will see this power line at your door. Surely that is something which is going to affect, very materially, the outcome of the agricultural work in the next five or six years.

And the last point is something very much more remote. And that is, the opening of the Orient. Japan has opened her doors and has awakened to national life. She has stepped across the sea, and opened the door of Corea, and shaken China out of her long sleep. When the 500,000,000 people in China, and the many millions in Corea, and Manchuria, open their doors and offer to trade with the rest of the world there is going to be some stir in the manufacturing life of the world. The farmers on the prairies of the Northwest, and the farmers in this Province, will in time, feel the effect of the awakening of those nations that have been so long asleep.

Agriculture is not a dead subject; it is not simply marking time; it is showing greater signs of development to-day than any other line of work that may be mentioned. It is expanding and broadening, and the men who are going to make the greatest success in the future, who are going to get the greatest benefit out of this movement, are the men who are going to put themselves in closest touch with the great educational movement which makes for the expansion and up-lifting of agriculture.

This Winter Fair, no doubt, in the next few years, will see many changes. As agriculture changes, we will have to change this Winter Fair. We may have to enlarge it, it cannot stand still. We cannot go on giving simply the same thing year after year; otherwise, this Winter Fair will be left behind.

One thing I would like to leave with you, whether you are veterans in agricultural work, or whether you are the strong men whose shoulders are now carrying the burdens of agricultural work in this country, or whether you are the young men in the full vigor of life, looking out with hope upon your future, and it is this: You are most likely to have pleasure in this work, and to get the most out of it, and to make the best use of it, if you recognize agriculture as not a simple thing, but as complicated, and affected by all these great world movements; and the man who develops himself along the right line will have the greatest possible means of success.

Those of you who come here from year to year, have the best wishes for the Winter Fair; those who come to visit us give us encouragement by their presence. Keep up your enthusiasm and never lose it; because in that enthusiasm is the key to the great success of this work.

RURAL EDUCATION.

By W. M. Hays, Assistant Secretary, Department of Agriculture, Washington, D.C.

I am quite overwhelmed. This is the flower of Canada; and down in the Fair Building are the fruits of your labors, and on yonder hill is the flower of your educational institutions. I have visited your homes, and learned of the geniality of your people. When I sat in one of the meetings of your Experimental Union, unknown to the speakers, and found they were saying things about my country, and the way we are generous to you in sending you some bulletins, as you send yours to our country, and saw your real feeling towards us, the blood tingled in my veins; and I realized that these people sitting here, are in their nature, and genius, and feeling, more similar to us than your relatives on the other side of the seas. A great land this, secured in the glacial area, with its mixed soil and mixed people. The most wonderfully opportune people on the face of the earth.

I am proud of your show; I am proud of the fact that it is centred around educational ideas; and educational plans. Here, the judge gives his reasons for his decisions. It is centred in the wisdom given out in your lecture room; it is centred in the wisdom of the judges of the carcases and the finished product of your farms. I was immensely proud of your show as I saw it on the lower floor; and when I saw your most magnificent poultry show, I was prouder than before. I have not seen its equal.

I come with something of a message to-night. I am going to state it simply, and plainly; and then I am going to talk about it in a general way. With the great agricultural states, from New York, and possibly Quebec, and Maine, and through the great Plains, and from what we on our side call the Mason and Dixon Line, to the region where it is not yet settled; that is the greatest agricultural bunch of land on the face of the earth; and they are piling up immense wealth. They are not only building up the great cities and the great trans-continental routes, that are connecting city with city, and the great chain of rivers and lakes, upon which our merchandize is carried, and the great electric roads, and before long, possibly we will be carried through the air. We are placing a great amount of wealth on the farms and public highways, we are putting better buildings on the farm, better churches in the country, and we are going to put a great deal of this wealth into educational institutions, under the leadership of such men as Mr. James, who has spoken to you so well to-night. We are going to have an educational system, far more complete than we have now. We are going to have in our rural school system, a system of education, including the rural school, the secondary school, and schools of the college grade. We are going to have the country school made into a farm school; a little consolidated school, if you please, accommodating an area of five miles square, with a van to bring the children to school; a cottage for the principal, and a principal educated to teach agriculture, as well as other subjects, with an assistant principal trained in teaching home economies, with other teachers to aid in the general primary studies. We will have these in every area that has land worth $40.00 an acre. This is a matter of immense importance, because it is going to bring to every farm boy and girl an agricultural education. This is a foundation part of the school system, for country life; and by no other class of school can we carry the products of agricultural research to all the people. In order to carry this out successfully, we need secondary schools, and the next step is an agricultural college to produce teachers for the agricultural high schools.

When the faculty at the University of Minnesota took up this school idea, and undertook to build a college course on top of it, they could not at first see how we could carry the work through; but during the last fifteen years, it has been accomplished. Two years ago Minnesota started a second agricultural High School. We found there were very few students going to that school from the Red River Valley, and we decided to put an agricultural High School up there, and it has been a great success.

Mr. James made a wonderful statement about the changes that are going on in agriculture. Let me mention one or two matters along the same line. The experimental stations on this continent, and on other continents, have spent in the past twenty-five years about $50,000,000 in agricultural researches. In another twenty-five years this very rapidly increasing line of work will have used half a billion dollars. This will produce such a wonderful body of knowledge regarding scientific organizations, and the management of the farm, and the development of plants and animals, that it will furnish material for this kind of education carried out by the scheme I have mentioned. Eighty years ago seventy-five per cent. of the people in the United States were on farms; to-day, they are only twenty-five per cent. What has taken the people from the country to the city? The great attraction of large manufacturing centres. Our problem is not to keep many people on the farm. We want only enough people in agriculture who can have all the support that the family can give; a fairly good income; can travel some, and have a splendid education, and can pay for it. Our problem is to take care of that twenty-five per cent. who remain on the farm, and we want to educate them, that farm life will be attractive to them: and if we succeed in doing that, we will have accomplished a great thing.

ADDRESS.

By Dr. J. G. Rutherford, Live Stock Commissioner, Ottawa.

I owe you a double apology. The fact is that during the past two or three weeks I have been indisposed; I have been suffering from a very severe attack of bronchitis. I have also been suffering from an attack of Meat Inspection Bill, having been engaged in drafting the new measure, which, owing to the recent revelations in Chicago, it has been thought advisable to enact. The situation was somewhat complicated by the expressed desire on the part of my Minister that the measure referred to should not only deal with the inspection of meat, but also with the inspection of fruit, vegetables and fish; three articles about which I know, at least in an official capacity, comparatively little. And my indisposition has also been intensified by the celebration of the annual festivity of the patron saint of my nation, St. Andrew. As President of the St. Andrew's Society of Ottawa, I have had to oversee and generally direct the arrangements for the triumphal march of the Great Chieftain of his race, "The Haggis"; so that I am sure I have the sympathy of the audience. I may add that it was only at six o'clock last night that I left the House of Commons, after the first reading of the Meat Inspection measure to which I have alluded.

As I have had the pleasure of saying before in this hall, it is a very great treat to me to come to Guelph. I am not a stranger in Guelph, although it is some time since I lived here. I was not here when the first tree was cut down, as was Mr. Monteith's father, but I am rather startled on realizing that it is, after all, only seventy-nine years since Guelph was founded, and that I was actually here when this flourishing city was only forty-eight years old. Thirty-one years ago I was a student at the Agricultural College. There were just seventeen of us at that time, and I had another shock to-night when I heard that we seventeen were the germs, the original microbes, as it were, to which the growth of scientific agriculture on this continent owes its beginning. (Laughter.) To a man who has all his life been engaged in a struggle against bacteria, to find that after all he is one himself, is a distinct shock. Of these seventeen original germs a number are still to the fore. Very few of them are farmers; some of them have gone into the learned professions; I do not know that any of them are in the Church; one or two have become doctors, one is a railway magnate, several are aldermen, and one has even become a mayor. Three or four are dead, and two have gone further and become lawyers. (Laughter.) You will see that this bacterial culture, the first incubation, so to speak, was scarcely a success.

There has been nothing more interesting to me than to watch the progress of the Agricultural College. The younger generation does not realize how much is due to the Agricultural College at Guelph, nor how much is due to the men who first crystallized into actual practical operation the idea of agricultural education in this Province. The work has been simply wonderful in its developments; it began by the young men going back to the various communities from which they came and applying the scientific methods of which they had acquired a knowledge at the College, and talking about these methods, with the result that after a while the semi-tolerant criticism with which their new departures were first greeted, was succeeded by an active spirit of interest. Later the men in charge of the College, realizing that the time had arrived for further active measures instituted the system of Farmers' Institutes, and the work has since gone forward by leaps and bounds. If there is any one thing that is admirable in a gathering of this kind it is the evident anxious desire of all who attend them, young men, middle aged men, old men and women too, to carry away with them all the knowledge they can possibly get. Visitors from the Old Country at our various Canadian agricultural gatherings are all impressed with the same feature, namely the anxious desire of our people to carry information away.

You recollect the manner in which Mr. Johnston enlarged on the beauty and intelligence of the audience, and how he stated that he had addressed meetings and had been present at gatherings in Scotland and England, but had never seen an audience to equal this. Between ourselves and in the strictest confidence, I was in Scotland with Mr. Johnston and heard him address a meeting there, and he excelled himself: there was no nationality in the world so dear to him, there was no people on earth to equal the Scotch, no women so fair, no men so intelligent.

It was said to-night that the old students are sending their sons to the Agricultural College, and while I have not sent any of my sons to the Agricultural College, because I have no sons to send, I have a few daughters, and I am inclined to think that some of these daughters will be very likely to find their way to the Macdonald Institute. I am very strongly impressed by the work that is being done by that Institute. I am very glad that after a long time the ladies are coming into their own.

I was greatly impressed with the other speeches, and I think you have got just as much solid mental food as you can conveniently carry away, and I am therefore, as you will observe, acting on the theory that perhaps a little in a lighter vein will not be out of place.

A few remarks were made about the progress which agriculture is making in Ontario. I spent some twenty years in the West, and for thirteen of those years I never came East and when I did come back, I can assure you I was more than gratified. I was deeply impressed by the great advance that had been made, the great improvements which had been achieved in the agriculture of this Province. At the same time things are advancing very rapidly in the West, especially in the live stock business, and the western live stock men are in close touch with you here. Representatives from the western provinces are attending this fair, and the men from the West are dropping in from time to time, buying a bull, a ram, or a boar and taking them back to that western country to help to build up their herds and their flocks. The country up there needs your live stock and I want to impress you that you must not neglect the western market. To my mind the day has gone by when the best market for the stock of Ontario is in the United States. I think our best market for our pure-bred stock is right in our own country, and that in Manitoba, Saskatchewan, and Alberta we have a market for all we can grow.

When the western Aberdeen-Angus men insisted upon having the headquarters of that Association in the city of Winnipeg, eastern men who were interested in that breed felt rather sore, and I said to several of them: "You are making a great mistake in being angry about it. This is one of the best things that ever happened to you. Your breed is going to the west, and you are going to have your breed settled in the west, and mark my words, the Shorthorn and Hereford men will lose in the west if you properly appreciate the situation, owing to the fact that the headquarters of the Aberdeen-Angus Association are in Winnipeg. I do not wish to see the grand old banner province of Ontario move the headquarters of all its breeds to that western country, but I want you to look at the western market as yours, to keep it, and to send your agents out there to work up that market and maintain a proper connection with your customers both present and future.

A remark somewhat savoring of regret was dropped by the Hon. Mr. Monteith in reference to your sons and daughters going west. I do not think you should mind that. Ontario is strong and great and good, but there is a great country in the West, and it is largely being taken up by foreigners. We are getting in a good many emigrants, some of whom we could do very well without, and it is a good thing indeed to have the leaven of the good old Ontario stock out through the newer Canada of the prairies.

A young man from Ontario goes west, gets one hundred and sixty, or perhaps three hundred and twenty acres of land and inside of two years he is a large purchaser, and his money comes right down to this Province of

Ontario. He buys his agricultural implements, furniture, and other manufactured goods, and thus assists in the development of your trade and in increasing the size of your cities. We are all under one flag, and all in one country, and it is not well to be patriotic only to one's native Province.

The progress which Canada has made in the last four or five years is simply phenomenal. The attention which she is attracting in the civilized world is remarkable in the extreme. Canada is becoming known and recognized, and we are to-day taking our proper place as the brightest jewel in the British crown; the greatest integral part, in point of territory, of what is to-day the greatest Empire the world has ever seen, and what with all due deference to our American friends and their great, glorious and progressive country, we Britishers take a certain amount of real pride in styling ours as the greatest self-governing country in existence.

LECTURES ON PRACTICAL SUBJECTS DELIVERED IN THE LECTURE ROOM IN THE WINTER FAIR BUILDING, GUELPH.

THE POULTRY INDUSTRY.

The Hon. Nelson Monteith, Minister of Agriculture for the Province of Ontario, occupied the chair during the meeting at which was discussed the subject of poultry. In opening the meeting he said: We have, gathered together in this building, what may safely be said to be the largest poultry exhibition that has ever been held in Canada. It exceeds in numbers that of last year by over four hundred entries, showing that the poultry industry is by no means a waning industry. The prices obtained for poultry products during the past year would seem to justify us in the belief that what we have already accomplished is but a foretaste of what is to come. They have been higher than for many years, and the prospects are that, with the increasing population in our urban centres, still higher prices are bound to prevail. Such being the case it naturally follows that this branch of agriculture should grow rapidly. It is one of the lines of agriculture that has a great many votaries. It does not require a very large amount of capital at the outset. We are trying to make the farmers throughout the country recognize that they can keep a small flock of poultry without much additional expense. No doubt this exhibition is largely supported by, what we may term, poultry fanciers, men who have made a specialty of some particular breed and have left almost everything else aside for that hobby; yet it is not a hobby; it is something that people can follow with profit and add vastly to their knowledge, and coming here from year to year, they receive great benefit from the educational part of the exhibition.

I do not believe the onlooker receives anything like the benefit that the exhibitor does. It is only when we enter into competition that we are spurred to that keenness of intellect that gives us a greater interest in our business. We are trying to develop the local poultry shows in the various centres where the amateur can come out and contest for the prize with a fair hope of success. He is no common amateur who is able to come down to the Guelph Show and get a prize of any kind.

You are not here to-night to listen to any extended remarks I may have to make, but I may tell you, in passing, that it has been the purpose of the

Government, during the past year or two, to add somewhat to the vote for the poultry interests. We do not say that in any spirit of boastfulness on behalf of the Government. We are merely the servants of the people, and it is our duty to watch the trend of interests and to spend the money where the greatest amount of good can be done, and anyone who has watched the expansion of the poultry trade, will recognize the fact that the poultry interests, in this Province, are bound to grow and become even more important than they are to-day.

Six years ago the poultry entries at this show were about 1,000; this year they exceed 4,000. We hope as years go on, that this work will increase and will justify still further the expenditure the Government is making in this connection.

I have great pleasure, indeed, on behalf of the Exhibition Committee, to welcome you here. We hope you will take a lively interest not only in the poultry branch, but every other branch that is illustrated in this great show. We believe this to be one of the greatest shows on earth. (Applause), and I say that in no boastful way. I do not say it is the largest show, but I think it is the greatest educational show in America. I hope the lectures to-night will be beneficial to all.

HOW MUCH POULTRY CAN BE KEPT ON A HUNDRED ACRE FARM?

By J. W. Clark, Cainsville.

The subject given me is quite a difficult one to take up. The conditions are so varied on a majority of our farms that it is difficult to arrive at a conclusion as to how much poultry should be kept. There is no doubt, the farmers can raise poultry better and cheaper than anyone else, because he has a lot of waste foods in his fields that the poultry can gather. It would be useless to try to raise any quantity of poultry unless you had the proper help to look after them; you also require a suitable place.

The farmer should have, at least, 100 layers. He would require a building of about 12x60 to accommodate these, that is, putting about six square feet to each hen, allowing a feed room at one end. It would be necessary for him to raise at least 300 chickens in order to select 100 pullets each year. There is a great deal in selecting the proper type. Then he would require suitable conditions for raising these chickens. He would require an incubator to hatch them in. It would be almost impossible to hatch them early enough with hens. As a rule hens do not get broody until May or June. Three hundred chickens would require a lot of labor, especially where they are fed by hand, but under the new system of hopper feeding, a lot of the labor is done away with. When the chickens are put in the brooder, they will require hand feeding for a few days, and after that you can put in a small hopper. As soon as they are large enough to put in a colony house you can put in a large hopper that will hold 3 or 4 bushels of feed, and allow them to go and help themselves, and you would only require to fill it once a week. I have raised between three and four hundred this summer, and I can say, from my experience, that the chickens have done far better when fed this way, because I am able to get them away out in the orchard where they get plenty of range. I think an orchard is an ideal place for chickens. If you are raising fruit you will find your apples will be practically free from the codling moth. After your grain has been taken off the fields you can shut your colony house up at night, and in the morning hook on the horse and draw it out in the field, and you will find they will soon pick up a lot of grain, and they will glean your fields and save a lot of expense, and they will thrive and do well.

The water problem is a great difficulty where you have to carry the water any distance in a small vessel. I have a barrel on a small stone-boat and have a tap in the bottom of the barrel, so that the water will just drip, By keeping the barrel covered the chickens can be watered with very little labor. The water in the barrel will last for two or three days. I think a large corn-field is a splendid place in which to turn chickens, especially young chicks. Professor Graham raised a large number in a corn-field, and gave them no water whatever, and they did remarkably well. From fifty to seventy-five ducks should be raised on the average farm. You would have to have a male and two females to get this number. If you have a good local market you should hatch them under hens. The duck is not so profitable if kept over eight or nine weeks of age. Give them all the feed they will eat up to that time and then market them. You can hatch enough under a hen to kill at one time. You will get probably from nine to twelve ducks hatched under each hen.

Q.—You must have pretty big chickens?

A.—I have the Orpington and I put twelve eggs under them. I would not risk that many early in the season. The farmer with 100 acres could also raise from 25 to 30 turkeys and could also raise from 20 to 25 geese. I do not think any fowl on the farm is more profitable than the goose, because they will live on pasture and you can carry them over the winter with mangolds or turnips. I would have the pasture divided off into lots in order to give them a change. It is not necessary to have a pond, running water is all right if you have it.

Q.—What kind of food do you put in this hopper?

A.—Wheat screenings.

Q.—Is not good wheat cheaper?

A.—No, I would prefer the screenings; we can get them for a cent a pound.

Q.—What do you have to pav for good wheat?

A.—You can get it now for 70c. or 75c.

Q.—I would prefer the good wheat?

A.—For young chickens I think screenings are the best; I do not mean half chess and oats and stuff of that kind.

Q.—Would you give them corn?

A.—I do not think much of corn for young chickens.

Q.—Do you only put one kind of grain in the hopper?

A.—Yes.

Q.—Do you put in any meat scraps or anything of that kind?

A.—Not when they are running out, I give them all the milk they want.

Q.—That is the effect of feeding too much corn?

A.—It is apt to stunt them, the same as you would if you fed too much to young pigs.

Q.—What kind of ducks do you raise?

A.—Pekin ducks.

Q.—What do you do when you find half of them are taken by hawks?

A.—When you are troubled with hawks the only way I know is to shoot them.

Q.—Last year we hatched out 200 chickens, and the hawks took 100 of them. I offered a man $5.00 to shoot the hawk, and he could not do it.

Q.—I have heard that a trap on a high pole is the best way to get a hawk.

Q.—What about rats?

A.—My houses are built on cement foundation, and I have never been troubled with rats. My brooders are put up on runners so that the cat can get under, and I have a fox terrier, that goes around with me, and he hunts out the mice.

Q.—Can you tell us anything about a brood of fowls called Faverolles?

A.—Yes, I have heard of them, they are a good table fowl, but they do not seem to be becoming popular in this country. They are a French fowl.

Q.—What would you advocate feeding for winter laying?

A.—I would say a mash composed of 40 per cent. bran, 25 per cent. corn chop, 25 per cent. oat chop, 10 per cent. beef scrap mixed with milk hot. I would prefer green bone if you could get it.

Q.—I understood Mr. Graham kept chickens in the corn-field without water; what substitute did he have for water?

A.—The dew is the only thing I know of. The chickens made remarkable growth. Milk is an ideal food for young chickens. I give them all the milk they want.

Q.—Is buttermilk a good thing for chickens?

A.—I never tried it, I would not like to give it fresh.

Q.—What do you feed chickens the first few days after hatching?

A.—I like the prepared chick foods that are on the market. If you have not got that bread crumbs and chopped eggs are good. Young chicks do not do well on sloppy food. Supply them with some kind of green food, such as a sugar beet or mangol grated up fine, it assists digestion.

Q.—Then you advocate dry food and dry water? (Laughter.)

A.—Yes, I do not say that I raise my chickens without water.

Q.—Would you recommend giving little chickens water when you first start to feed them?

A.—Yes, I would recommend giving them water right from the start. I would give them all they want, unless they were very thirsty, from the fact that you had forgotten to water them, then I would not let them gorge themselves. If you are feeding dry food then you must give them water, but on soft food they do not require so much water.

Q.—Are your hens laying now?

A.—Yes, I am getting a couple of dozen a day. I feed them a mash just before they go to roost.

Q.—Do you put pepper in the mash?

A.—No.

Q.—Do you think it is good feed for them when we have zero weather?

A.—On an exceptionally cold night I would take some corn and warm it and give it to them before they went to roost.

Mr. Gilbert, Experimental Farm, Ottawa: I have no desire to intrude, but I think there is a very important phase being left out of Mr. Clark's address. I meet a great many farmers in going about this country and they say, "It is all very well to talk about raising chickens in incubators, but at that time of the year we are very busy plowing and other work, and what are we to do?"

A.—Let the women do it.

Mr. Gilbert: You are a bachelor, because you would not say that if you knew anything about what a woman has to do on a farm. The crying trouble with the farmer to-day is the labor problem. But what about the boys and girls? Why not let them run the incubators? I have tried that with my own children, and I find that boys and girls can operate incubators a great deal better than old people. You can say to them, "I will give you one-half the profits if you will take charge of this part of the work." That way you enter into partnership with your sons and daughters, and you may inculcate in your children a love for the work and for the farm, and they may never leave the farm. Too many of our boys and girls wander away from the farm and never look back.

FATTENING CHICKENS FOR EXPORT.

By Adam Armstrong, Fergus.

We have been at this business now some six years. When I first started I went to the planing mill and had them make 100 fattening coops, each coop capable of holding 20 birds. We could thus fatten 2,000 birds at a time. We did not have 2,000 birds to start with. I employed a man who was an expert at fattening chickens and it was not long before we had our coops full, and they did well, but there was a number of birds that seemed to take indigestion and a number of them died. When the season was over we balanced our books and we were $100.00 behind and we had 100 fattening coops on our hands which cost $175.00, making a total deficit of $275.00, and then I thought of the plan of letting the farmers have these fattening coops and do the fattening themselves. One man put 20 birds into a coop he got from us, and when he took them out they had paid for the coop and paid for the food and he had 10c. left over on that lot, and he had the coop to the good, and he was well satisfied. The next year I gave out eggs to any farmer who would bring me back the chicks. I sold the eggs at 25c. a setting. In that way the farmers got well bred birds and we got a higher standard of birds to fatten and, by that means, we have now got nearly all the birds in the district pure Plymouth Rocks. There may be other varieties as good as the Plymouth Rock but we have not found them yet. At the present time I have 150 of these coops out with the farmers who are feeding the birds and bringing them in to us and I have placed an order with a saw-mill man to make 100 more coops, to distribute out among the farmers and I am going to let them have them for nothing but I must have the birds they fatten in them. We are now paying 9c. a lb., for crate fattened chickens alive. Last week we weighed in 850 of them and to-day and yesterday we weighed in 350. That will show you the interest the farmers are taking in our district.

Professor Graham: How many do you take in, in a year?

A.—In 1903, 1,467; in 1904, 1,973; in 1905, 2,994, and in 1906, 3,607. By these figures you will see that it is gradually increasing and this has been done by getting the farmers interested in the fattening of chickens and by showing them the benefit of fattening in this way. I also use a circular, which I distribute among the farmers, as follows:—

To fatten birds for the export trade it is necessary to have the proper coops to put them in. These should be two feet long, twenty inches high and two inches deep, the top, bottom and front made of slats. This size will hold four birds but the cheapest plan is to build the coops ten feet long and divide them into five sections.

WHAT TO FEED: Oats chopped fine, the coarse hulls sifted out, two parts, ground Buckwheat one part, mix with skim milk to a good soft batter and feed three times a day; or black barley and oats, two parts oats to one part barley. Give clean drinking water twice a day, grit twice a week and charcoal once a week. During the first week the birds are in the coops they should be fed sparingly, only about one half of what they will eat. After that gradually increase the amount until you find out just how much they will eat up clean each time. Never leave any food in the troughs as it will sour and cause trouble. Mix the food always one feed ahead. Birds fed in this way will be ready for the export trade in from four to five weeks. Chickens make the best gain put in the coop when weighing three to four pounds each.

I happen to have in my coops at home a batch of chickens, I got from a farmer, that were not crate fattened. He brought them into town and asked me to buy them. I asked him, "Are they crate fattened," and he said, "No, but they are just as good," I said, "I cannot give you more than 7c. a lb., and I do not want them even at that price, but, if you will take them home and feed them five weeks, I will give you 9c. a lb.," He would not do that, and I put them into crates and fed them, and in five weeks they made an average gain of 2.5 lbs; and they just about doubled their money in the five weeks. If I had kept track of the cost of the feed I think I would have made, at least, from 13 to 15c., per head for the five weeks feeding. One young man told me this year that it just cost him 13c. per bird for the five weeks, and they gained 2 1-3 lbs. in that time. I fed them three times a day for the first two weeks and twice a day after that. You can feed them just as well at night as in the daytime and you can put the feeding coops in the pig-pen and fed them at the same time as the hogs.

Q.—Do you think you should keep them in the coops five weeks?

A.—I certainly do. We have tested them in three weeks, four weeks and five weeks, and we get the best birds in five weeks.

Q.—Would it be advisable to coop up ducks?

A.—I do not know anything about ducks.

Q.—Do the farmers feed them five weeks?

A.—Yes, you can injure the birds by keeping them too long. We, occasionally, get a bunch that has been kept seven weeks and they are not as good.

Q.—What is the difference between a crate fed bird and a stall fed bird?

A.—There is a great difference, you can tell it at once. There are muscles in the stall fed bird and there are none in the crate fattened bird.

Q.—Do they eat their feathers?

A.—Yes, I have found they do. This year I put a little more salt in the feed, and I did not have any trouble with feather eating.

Q.—Do your birds moult?

A.—Yes, quite often.

Q.—What kind of grit do you use?

A.—I like the mica spar; any kind of gravel will suit.

Q.—Did you ever try fattening old birds?

A.—If you take an old bird and put it into a coop and fatten it, it will do better than a ordinary chicken running around. The muscles will be gone and it will be almost as tender as a chicken.

PRECAUTIONS NECESSARY TO SECURE LARGE HATCHES AND TO HAVE MINIMUM LOSSES IN YOUNG POULTRY.

By L. H. Baldwin, Deer Park.

I am not responsible for the selection of the programme, and you can see that the title allotted to me covers a good deal of ground. I want to preface my remarks by saying that, in going into a number of precautions, as I must do, I do not wish to appear to frighten anyone with regard to the question of artificial incubation. We have yet to learn a good many things in reference to incubation and yet it is astonishing the wonderful sucess that amateurs have in operating incubators. First, there is the breeding stock from which you secure your eggs to be considered and then there is the care of the eggs from the time they are laid until placed in the incubators, and then the care of the eggs when placed in the incubators. The question of stock may go back a good many generations. We know it has been said "that the sins of the fathers are visited upon the children" and that, I think, is a general rule in nature. If the breeding stock has a tendency to lay eggs that are unfertile, or with weak germs, it is likely that their progeny will have the same defect. It has been suggested that the birds be trapnested for fertility. By so doing we can strengthen our breeding stock by selection. It is not many years ago when most people kept their hen houses closed up and were inclined to believe that warm hen houses were necessary. That was a mistake and we have found that the open air hen house keeps the flock in the most vigorous condition, a very necessary precaution for securing real good strong fertility in the eggs. You should throw open the windows of your hen house every day. Never mind how cold the weather is, as long as the sun is shining keep your hens exercising in the sunshine. It is the man who is working out in the open air who has the strong vigorous constitution. One thing you must be very careful about is the feeding of your birds. If you feed too heavily they will lay on fat, and will injure your hatching prospects during the next season. After you have got your eggs the hatchability is considerably affected by the temperature to which they are exposed. It has been ascertained that the germ in the egg will incubate at the temperature of about seventy degrees. If the egg has been kept at a temperature of above seventy the germ will slowly incubate. Where we have a temperature in the summer running up to 80 degrees and 90 degrees you can easily understand the damage that is then done. Considerable damage is done to eggs shipped long distances by being placed too close to the stove in the express car. Then they are taken out of the car and cooled for a day or two before being placed in the incubator. On the other hand eggs may be too cold. In the winter time you must be careful to gather your eggs two or three times a day so that they will not be chilled.

Then the question comes of handling the eggs in the incubator, and that is a subject for a whole evening's address. If you have good strong eggs and place them under a hen you are almost certain to get a good hatch. It is an extraordinary thing that an incubator may do well one month and the next month fail entirely. I do not think I will go so far as to say it is entirely the fault of the machine, but there is something in the conditions under which these incubators are operated that affect the hatch. Then there is the question of the temperature under which we should run the incubators. I would not advise anybody to run an incubator in any other way than under the directions of the manufacurer. He is supposed to know his incubators best. If you do not have the results that you think you are entitled to, then I would begin to experiment on my own account, and one suggestion I would make is to run your temperature a little higher than the ordinary incubator manufacturer directs. I have found that to be an advantage, especially when one comes to deal with the other side of the question, viz., to have the minimum loss in the young poultry. You may have splendid hatches, but if your mortality in the young chicks is considerable after they are hatched every chick that dies is a loss, and takes so much off your profit, and is a great discouragement. I would certainly rather have a comparatively small hatch and a large percentage of the chicks live than to have a large hatch and a high rate of mortality. The Chinese treat their eggs entirely different for the first ten days to the way they do the last, and I believe there is something for us to learn from them in the manner of starting the germs. I think it is most important during the first twenty-four hours. If you have the germ well started in a vigorous condition I think that imparts a characteristic vigor to the chick. Doctor Dorest, in France, made a close study with regard to incubation to find out if he could discover the cause for deformities in chicks. He tried artificial incubation at various temperatures, treated the eggs to all sorts of conditions, gave them shocks from end to end and side to side, and sent them away on railway journeys, and he found that by giving comparatively low temperature at the early part of the hatch, the development being sluggish, a sluggish character was imparted to the chick and it had not a vigorous growth; and I think that is an answer to the question so often asked as to "why so many chicks die in the shell?" Some say it is due to not giving them enough moisture at the end of the hatch. I think the answer is the chicks had not strength enough to kick themselves out and the reason was because there was not vigorous growth at the start.

Q.—Do you run your incubator with the suspended thermometer?

A.—I think every person should run their incubators with two thermometers. Have one suspended by wire from the top of your machine with the bulb of the thermometer half an inch from the top of the eggs. I have what are called veterinary thermometers to place on the top of the eggs. They will record much more accurately than the ordinary incubator thermometer. I think it is best to keep the thermometer on the eggs at 102½ to 103½. I think that 103 is better than the lower temperature. It is well to keep the ventilators closed up during the early part of the hatch, so that there will be no great draught, and I think the open bottom incubator had better be closed up as much as possible. Keep a uniform temperature. The Chinese give their eggs no ventilation whatever except when they take them out of the ovens to cool them. While they are actually in the oven they have no ventilation during the first ten days, and in the last ten days they are right out on open shelves.

Mr. Gilbert: If your germs are strong do you think a few degrees in the incubators makes any difference in the results?

A.—I do not think it does later on in the hatch.

Q.—Why be so particular as to the exact points of temperature. I think there is a great deal of trouble made for the farmer by this kind of work. I think we should get things down as simple as possible so that the boys and girls can run the incubators. My experience, extending now over nearly one-quarter of a century, is that there is more in the germ than there is in the incubator. I have had incubators that were draughty and they hatched out the chicks. I told the maker his incubator was draughty, that it would hardly hold the heat, and he said, "I made it so as to let wind into it."

Mr. **Baldwin**: I prefaced my remarks by saying that I did not want the audience to be frightened by the precautions I gave, because a great many amateurs who start out are wonderfully successful.

INVESTIGATIONS DURING 1906.

By W. R. Graham, Manager Poultry Department, O.A.C., Guelph.

As the hour is getting late I do not think it would be wise on my part to give you any detailed account of all the investigations that have been carried on at the College during the last year. In our work of artificial and natural incubation we are hatching chickens practically the year round, beginning in January and ending in the middle of September. We had a number of June and July hatched chickens, and in other years we found it almost impossible to raise them on ground that had been run over by other chickens. This year we were particularly interested in artificial and natural incubation from a scientific standpoint, and we did not care a great deal what became of the chickens after they were hatched, so long as they lived to two weeks of age. We simply dumped them down in a cornfield. We had a cornfield of about twenty-five or thirty acres. The chickens were hatched with incubators and with hens and were brooded entirely by hens. Each hen had about fifteen chickens. The way we got the hen to mother the chickens was by putting a few eggs under her for four or five days, and then at night we would load her up with chickens. Occasionally we would find a hen that did not want the job, and it was peculiar that a black hen would kill the black chickens and a light hen would kill the light chickens. We put an ordinary brood coop out in the corn-field, and put a hopper inside of it, and filled it with wheat and some corn and some dry bread crumbs, and in some we put commercial chick food. These hoppers would hold about a quart. The hen was put in and the chickens with her, and they were left there for two days, and in some cases three days. Then we took the front out of the coop and away they went, and we put one large hopper, that would hold a bagful of wheat, in the centre of a circle of coops and filled the hopper once a week with wheat. We never watered them, and I will tell you why. This cornfield was about half a mile away from the plant and we were not carrying water that far for chickens. If the dew was any good they had it. This cornfield was cultivated, the ground was moist and there was abundance of insects and lots of earth worms.

Q.—Did you have much rain?

A.—Yes, we had rain and dry weather too. I had a man come all the way from the centre of Philadelphia to see these chickens. We had three hundred of them that would average two pounds each, when they were eight weeks old, and chickens that were kept on ground that had been run over by other chickens weighed less than a pound when they were eight weeks old. The chickens that run in the corn-field were fat and plump, and were the best broilers I ever killed either in Canada or the United States, and it costs less than four cents a pound to raise them. I have here a pair of chickens hatched the first day of August, and that run in that cornfield, and were fed as I have described. When the corn was cut, about the 1st of November, there was a patch of mangels beyond the corn and after the mangels were pulled they came back in the turnips, and when they got through with the turnips they ran up and down the field. They encountered two snow-storms. They roosted in their coops at night. On the first of November we brought in what was left of them; we had been killing them for private buyers. When they were four months of age they weighed about five pounds each. Here is a pair of chickens four months old that weighed five pounds each. They were fed in a crate for a while before they were killed. I want to impress upon you the necessity of putting chickens on ground that has not been run over by other chickens the year before.

THE CULTIVATED BARLEYS.

By J. Buchanan, Lecturer in Field Husbandry, O.A.C., Guelph.

For many years we farmers have discussed the growing and marketing of all classes of farm crops, from a "practical" standpoint, and have inclined to make light of what is called theory or science in regard to farming. Most assuredly it is wise to take a good practical sensible view of all matters pertaining to our chosen occupation but it is high time we were awakening to a knowledge of the fact that science is not, as many of us have thought, impractical theory fit only for Professors of Colleges, but that it is in large measure simple, practical, common sense. As soon as we can bring ourselves to know that science is not complex knowledge, beyond the reach of ordinary men, but that it is simply knowledge systematized or placed in good order, and therefore simplified, we will be in a fair way towards making progress more rapidly than we have done in the past. If we learn to systematize our knowledge as we systematize our work, we will soon find that in many parts it is incomplete, and will therefore seek to make it more complete by observation and by reading. The degree of our success in farming will depend largely on the degree of our knowledge, and only when we have complete knowledge can we hope to meet with perfect success.

I propose to speak for a short time this morning on the classification, relationship, and practical value of the various kinds of barley grown in different parts of the world, in the hope of arousing a greater interest in the study of farm crops in general by showing that there is much to be learned about even such a common crop as barley.

In speaking of barley we usually think of it as being divided into two varieties; viz., Six-rowed and Two-rowed: sometimes we include a third variety, known as Four-rowed. These terms refer, of course, to the number of rows of seeds in the ripened heads of the different varieties, or, as they are more correctly called, classes. In reality there are only two great classes, since there is no true four-rowed barley. For convenience and clearness I have prepared the accompanying chart to show a fairly complete classification of all cultivated varieties.

Six-rowed	Common Six-rowed	Bearded	Hulled	White (1)
				Black (2)
			Hulless	White (3)
				Black (4)
		Beardless	Hulled	White (5)
			Hulless	White (6)
	True Six-rowed	Bearded	Hulled	White (7)
Two-rowed	Erect heads	Bearded	Hulled	White (8)
	Nodding heads	Bearded	Hulled	White (9)
			Hulless	White (10)

I have also placed on the table, specimens of the ripe heads and samples of the threshed seed of the various types belonging to the two great classes or groups. These you may examine more closely at your leisure.

On looking over the chart you will notice that the two groups are divided and subdivided until there are ultimately ten distinct classes. Classes 1, 5, 8, and 9 are each made up of a number of more or less distinct varieties, differing in length or strength of straw, amount or quality of seed produced, time of maturing, etc. In the remaining classes there are but few varieties.

While some kinds of barley produce heads with six rows of seeds and others produce heads with only two rows. it is none the less true that all sorts have six rows of *flowers* on the head. In the six-rowed kinds all the flowers are perfect and all produce seeds, while in the two-rowed varieties the two outer rows of flowers on each side of the head are barren and only the flowers of the central row on each side are capable of developing seeds, hence the two rows of seeds on the ripened heads.

I have already referred to a kind of barley known as four-rowed. The term four-rowed is not often used in Ontario, but we frequently hear of this kind of barley being grown in Great Britain, where it is more frequently called Bere or Big. In reality it is the ordinary six-rowed type grown in Ontario, of which some of our most common varieties are "Mandscheuri," "Oderbrucker," and "Common Six-rowed" (Class No. 1 on chart). Varieties of this type are sometimes said to be four-rowed because the outside rows on the two sides of the head frequently overlap to such an extent as to give the appearance of being one, and the head therefore appears to have four rows rather than six. In this class of barleys the heads are always more or less flattened and the seeds of the two outer rows on each side of the head are smaller than those of the central row and are often slightly twisted in appearance. The chart shows that in the six-rowed group we have both hulless and beardless varieties. In general it may be said that the hulless varieties lack strength of straw, but the grain, owing to the absence of hulls, weighs about sixty pounds per bushel. The beardless kinds usually possess a fair strength of straw, but are comparatively poor yielders, and therefore cannot be highly recommended to Ontario farmers. No doubt many growers would be glad to dispense with the beards if they could do so without also sacrificing the heavy yield.

The *true six-rowed* type of barley, referred to in the chart, is practically unknown in America. In this class the heads are not at all flattened and have six rows of seeds uniformly developed, giving the head a perfect star shape when viewed from above. We know little of its practical value in Ontario as yet, since we have not yet had time to give it a thorough test at the experiment station. I may say, however, that it produces short, strong, straw and large heads and has a good appearance when growing.

Among the two-rowed varieties there are two very distinct types, and these differ widely in use as well as in appearance. The varieties belonging to the first of the two-rowed types, referred to on the chart, possess stronger straw than any other kind of barley that has been tested on our trial grounds. They also produce short, compact, erect heads and large plump seeds of uniform shape and appearance. This is commonly known as the duckbill type of barley, and the "Duckbill" and "Canadian Two-rowed" are two of the leading varieties of the type. As a rule they do not produce quite such a large yield as the best six-rowed varieties, but the grain has a better appearance and, owing to the uniform size and shape of the seeds, they germinate much more evenly and are therefore better suited for malting purposes than are the seeds of six-rowed kinds.

The varieties belonging to the second type of two-rowed barley, often referred to as the Chevalier type, have very long, slender, drooping heads and exceedingly weak straw and are very difficult to harvest because they almost invariably lodge badly before ready to cut. It may be said on their behalf, however, that they excel all other kinds in the production of malting barley, as the seed is uniform in size and shape, giving even germination and has a high starch and low protein content which makes it especially suitable for malting. Varieties of this type are grown almost exclusively for malting purposes in England and an attempt has been made to have them more widely cultivated in Canada to supply the English brewers, but the effort has met with little success, owing to the fact that the crop lodges so badly and does not produce such a large yield of grain as the six-rowed varieties.

If there are any questions you wish to ask before I resume my seat I will be pleased to answer them to the best of my ability.

Q. Are there any distinguishing characteristics between the Mandscheuri and Mensury varieties?

A. Our experiments have shown a considerable difference in yield, and some difference in the vigor of the plants, but I have not observed any structural difference which could be taken as a constant distinguishing feature.

Q.—Was not that difference due to a longer period of selection?

A.—We have had the two varieties under test for the same length of time and both have been treated in exactly the same way.

Q.—How does No. 21 compare with the others?

A.—Possibly some of you do not know what No. 21 is. It is a new strain of Mandscheuri barley, originated at the College by a system of very careful plant selection. The parent plant of this strain was selected as one of the very best from a plot of 2,700 plants grown under uniform conditions. It has not yet proven to be superior to the original Mandscheuri in yield, but has stronger straw and a much finer appearance when growing.

Q.—Has the strength of straw been characteristic right through from the start in favor of No. 21?

A.—Yes it has in our experience and all of the farmers who tested the two varieties side by side during the past summer reported in favor of No. 21 in this respect.

Q.—I gather from what you say that you are working along the line of feed barleys; you are not doing much for malting?

A.—Not at present.

Q.—Is there any likelihood of our developing a trade in export barley for malting?

A.—We are trying in our selection work to get a strain of the Chevalier barley (that is the malting barley) that will be stronger in the straw. We have done the same kind of selection work with the Chevalier as we have with the Mandscheuri, for the purposes of getting a stronger straw, but we have not succeeded in getting a good one yet. We are crossing the Chevalier with the Duckbilled class to try and get the strength of straw. If we can get a malting barley strong in the straw, then we will have good malting barley and possibly might be able to offer barley which would be satisfactory to the English brewers.

Q.—Do you really think it worth our while to pay much attention to that?

A.—Of course we want to reach out in all possible lines, but our barley is used chiefly for feeding purposes and I am not certain that it would be of great value to the Province to develop a market in the Old Country for barley.

Q.--It just occurs to me that we may complicate this question and spoil what might make a first class article for our own use?

A.—That is worth considering in our work.

POINTS TO BE CONSIDERED IN SELECTING AN EAR OF CORN FOR SEED.

By L. S. Klinck, Macdonald College, Ste. Anne de Bellevue, Que.

I offer no apology this morning for speaking on the topic assigned me. I believe the subject of producing seed corn in Ontario is a live one. The fact that there is a difference of opinion on this point may, for the time being, add to the interest, but primarily this interest has been awakened and sustained by a pressing need. To throw some light on this problem, looking towards its solution, is the purpose of this address.

Can Ontario produce her own seed corn? If she cannot, my talk this morning will be of interest to few; if she can, it should be of interest to all. From what I have been able to learn from carefully conducted field tests, and from corn growers who have been successful in producing their own seed corn for years. I believe she can. I have reference now chiefly to Ontario's corn-belt,—a district, so far as commercial seed corn production is concerned, practically embraced in the Counties of Essex, Kent and Elgin.

This year for our corn work in Ste. Anne de Bellevue we obtained seed corn from thirteen growers in these counties and, notwithstanding the fact that we had a cold backward spring, the corn averaged 90 per cent. germination in the field. The man who has made careful field germination tests will be the one who will most appreciate these results.

The sweet corn on the table before me was grown at the Macdonald College this past season, and yielded at the rate of 106 bushels per acre of thoroughly dried seed-corn. The only fertilizer used was a light application of barn-yard manure in the spring. Seed of the flint corn to my right was obtained in the Eastern Townships, Quebec, and planted at Ste. Anne's. Although it was not planted until the 6th of June, it was perfectly matured three weeks before the frosts were sufficiently severe to injure the foliage. This plot was one quarter of an acre in size, received no artificial fertilizer or manure and yielded at the rate of 65.9 bushels of shelled corn per acre. Undoubtedly we have yet much to learn regarding varieties, cultivation and handling of this important crop, but by co-operating with nature my fears for ultimate success are not grave.

Consciously and unconsciously corn has been selected in a crude way for centuries. The fact that in harvesting the crop it was necessary to handle each ear separately made the selection of the largest and most symmetrical ears a comparatively easy matter. It is true that by this method performance and real efficiency were often sacrificed to good appearance, as is too often the case at the present time. An ear possessing outward character and strength and approaching perfection so far as conformation goes need not necessarily be a productive or a desirable ear to plant. If, in addition to a good external appearance, the individual kernels are of the desired conformation we can more nearly determine the true efficiency of the ear so far as feeding value is concerned, but it is only by a comparative field test of different ears that we are able to determine the prepotency or projected efficiency of any ear.

Realizing the wide range of varieties and types of corn grown in Ontario, I shall not specialize too closely, but hope to direct your attention to some fundamental points to be considered in selecting a good seed ear.

Conformity to Breed Type. All ears intended for seed purposes should conform to the desired standard in shape of ear and kernel, in colour of grain and cob, in purity, size, uniformity, filling of butts and tips, indentation of crown (in the case of dents), depth of kernel, space between rows, straightness of rows and proportion of corn to cob. Conformity to a desirable type should be insisted on, as it has been repeatedly demonstrated that pure bred varieties give not only higher yields but corn of better quality than that produced by nondescript breeding.

While this is true, broadly speaking, it must ever be borne in mind that it is unwise to pay such close attention to detailed evidences of good breeding that real efficiency is neglected or overlooked. Again, no variety of corn, no matter how productive it may be, can ever hope to win public favour and become widely known if it attempts to justify its existence on the grounds of productiveness alone. However prone we may be to overlook the æsthetic side of grain production and lay emphasis on the financial results. somehow we all insist that an ear of corn has those evidences of breeding which give such added interest and satisfaction in growing and handling the crop. Efficiency and conformity to a fixed type are not antagonistic.

Shape of Ear. The shapes of ears will vary from the cylindrical to long pointed forms according to variety and the conditions under which they have been grown. Ears full and strong in the central portion are most desirable as they indicate a high per cent. of corn to cob and corn of superior feeding qualities. An ear properly proportioned in the centre is indicative of strong constitution and high yield, as a correlation exists between ears and the kernels of which they are composed.

Shape of Kernel. A good kernel, especially in the dent corns, should be broadly wedge-shaped, strong and plump at the tip and should carry its sides well up to the crown giving a strong full shoulder. The germ or chit should not only have a large surface but should be carried well down to the back of the grain. The germ is high in oil; the hard horny part of the kernel is rich in protein.

In selecting an ear of corn for seed always remove two or three kernels and study them in connection with the ear. If the kernels are undesirable reject the entire ear even if to outward appearances the ear is good. Many a poor ear is used for seed or show purposes which would never have been considered had the owner removed a few of the kernels and made a careful study of them before making his final selection.

Butt. The butt should be symmetrical, full and strong and made up of straight rows composed of kernels conforming as closely as possible to those in the centre of the ear. A full rounded butt is indicative of strength and adds the element of character to an ear but it is not desirable to have it round out too fully and become too constricted as there is a danger of its weakening the shank to such an extent that the ears break off prematurely. Open or swelled butts are always objectionable.

Tip. The tip should be in proportion with the body of the ear and round out symmetrically and naturally. The rows should be straight and kernels retain as nearly as possible the size, shape and indentation of those in the centre of the ear. Too much attention should not be paid to the complete covering of the tip, as the kernels here are not so valuable for seed or for feed as those in the centre of the ear. In addition to this, when undue attention is directed to securing ears well filled out at the tip there is danger of doing so at the expense of shortening the ear in the most valuable part.

Purity of Colour in Grain and Cob. Strict adherence to a uniform colour is essential in maintaining purity or freedom from mixture in any variety. The degree or depth of colour in kernels or cob is of minor importance when compared with the question of mixture. Corn intended for seed should not be planted within a quarter of a mile of another variety of corn. Even if all the kernels not true to colour are removed from an ear there is a strong probability that many kernels on the same ear, although apparently pure, are in reality of a different origin. Xenia, or the direct effect of pollen on the solks is not always shown in the colour of the endosperm, but may be confined to the embryo. This being the case it is not good practice to plant for seed any ear having many mixed kernels even if all the kernels not true to colour have been removed as the influence of the previous cross pollination may at any time manifest itself in subsequent generations. White corn should have white cobs; yellow corn should have red cobs.

Uniformity of Kernels. Under this heading is considered not only the uniformity of the kernels on the ear but also the conformity of the ear and its kernels with the rest of the sample. As the kernels on the butt and tip of an ear cannot conform closely to those in the centre they are shelled off when a uniform sample is desired for seed. Blocky or irregular kernels in the central portion of an ear are considered much more objectionable than if they were found at the ends, as it is much more difficult to remove them.

Uniformity in size and shape of kernels is very important, especially when a planter is used, as a lack of uniformity renders it impossible for any planter to drop the desired number of kernels to the hill.

Vitality. As used in this address, the work vitality is not restricted to a kernels ability to or lack of ability to germinate, but is used in the wider sense to indicate its strength and probable reproducing power when it does grow. A kernel full and plump in the tip and having a bright vigorous germ is most desirable. Kernels weak and pointed at the tip do not have a sufficient store of reserve food to give the tiny plant a strong start in life. All such kernels should be discarded.

No point in seed selection requires greater care and the exercise of more accurate, painstaking judgment than that of rightly estimating the relative discount that should be made for different evidences of immaturity, or for signs of injurious effects resulting from improper storage. In many cases the only way to make even an approximate estimation of the germinating power of any sample is to make an actual germination test.

In order to determine the relative value of the different types of immature kernels so frequently found in selecting seed corn, germination tests were conducted by the writer in the field and in the greenhouse. Five classes were experimented with and the conclusions drawn from the results form the basis for the statements regarding each class.

Chaff or Cob adhering to Tip of Kernel. It was found that chaff adhering to a kernel, as it often does in immature ears, was not sufficiently detrimental to warrant discarding such kernels, providing this was the only evidence of immaturity, as the growth of these kernels, both in the field and in the greenhouse, was satisfactory.

Black Tips. Kernels with the tip cap removed exposing the black covering of the embryo grew well when planted in the greenhouse and under field conditions gave a good stand. The tip cap is intended as a protection for the young plant and when removed the water readily enters. If planted in a cold wet time such kernels frequently rot, but when planted under favourable soil and climatic conditions give but little indication of impaired vitality. These statements apply only to those kernels in which the tip cap remained in the cob on shelling. The black skin-like covering immediately under the tip cap is natural to every kernel. Objection can be taken to its appearance only when it is exposed through removal of the tip-cap in the process of shelling.

Wrinkled, Blistered or Shrunken Germs. Kernels showing these evidences of immaturity are arranged in the order in which objection should be taken to them. Corn stored in a very warm place will shrivel and become uneven on the surface, just as an apple, when left in a warm room, shrinks irregularly from its outer covering leaving ridges and depressions. Unevenness on the surface of germs due to this cause should not be regarded as objectionable, but a shrunken or blistered germ is very serious if the covering of the germ is raised to any considerable extent as a result of exposure or freezing. The vitality of such germs is almost invariably greatly impaired, if not wholly destroyed.

Starchy, Shrunken or Blistered Backs. Whenever exposure or freezing has been severe enough to blister the back of a kernel its chances for germination are poor. This is one of the strongest indications of injury resulting from imperfect ripening. When the back of a tip shows a decided depression it is strong evidence that the kernel has not had sufficient time to develop properly. A kernel depressed on the back is usually deficient in the hard, horny, glutinous material and is therefore composed largely of starch.

Condition of germ as indicated by its cutting qualities. A properly developed and carefully dried germ cuts readily and presents an oily appearance. It is light cream in colour and can be cut in very thin layers, which roll up like fine shavings. If kiln dried, less oil will be apparent and in cutting the layers will break up readily. A frozen germ, on the other hand, lacks this healthy oily appearance. It is tough and elastic and unless the knife is sharp the germ is sure to shove or roll. When cut it presents a dark, glistening, soggy appearance.

Size of Ear. The length and circumference of the ears chosen must be governed by the locality in which the corn is grown. The tendency has been, and still is, in the direction of growing varieties too large to mature properly. This is a mistake. It will prove more profitable to grow a smaller corn which will mature every year than to grow a large corn which seldom if ever ripens properly.

In dent corns the proportion of length to circumference should be as four is to three, *i.e.*, an ear ten inches long should measure seven inches in circumference about three and one-half inches from the butt. Short thick set ears are inclined to have long deep-set kernels which makes it impossible for the ears to dry out readily in the fall unless the variety has been carefully selected for years to combine early maturity with depth of kernel. It is, of course, advisable to grow as large and deep-grained a variety as can be safely depended upon to mature in any given locality.

In flint varieties the length of the ears differ so widely that it is a more difficult matter to establish a fair proportion. As a general rule the production of long pointed ears should be discouraged as they are almost invariably poorly covered at the tip.

Space between Rows. Wide space is undesirable in any but deep-grained varieties. It is generally caused by rounding of the crowns. As there is no good reason why the kernel should not carry its sides squarely up to the shoulder and thus fill practically all the space with corn, wide spaces are severely cut. In addition to the serious loss occasioned by this conformation the chief ground for objection to them is that they are an indication of degeneracy or reversion to a more primitive type.

In some varieties like Reid's Yellow Dent, the rows are frequently paired, the inner sides of the rows forming the pairs dovetailing,—the outer sides being carried up straight to the crown giving a square blocky shoulder. In the deeper grained varieties the rows are seldom paired and the furrows are much wider. This is a wise provision of Nature, making it possible for the deep-grained corns to dry out more readily. Flint varieties are grown where the season is short. Naturally the amount of space between the rows is great and the kernels flinty and rounding on the crown.

While open rows are objectionable, rows having too little space are fully as undesirable. A certain amount of space is necessary for maturing the kernels. If this space is too limited the kernels almost invariably show wide space between the kernels at the cob, and as the tip is the most valuable part, the importance of having it full and well developed is apparent. The presence of those wide spaces between the kernels accounts for the fact that so many close rowed ears are so light in weight and shell out such a low percentage of corn.

Proportion of Corn to Cob. It is practically impossible to lay down a standard on this point which will apply to any considerable section. Dent varieties will range from 78 to 86% shelled corn; flint varieties will range from 74 to 81%. A good average for the former would be 83%; for the latter 79%. As it does not necessarily follow that a large ear will shell out more than a much smaller one, in selecting seed corn close attention should be paid to the points just mentioned which go to make up a solid ear. To ascertain the proportion of corn to cob: weigh the entire ear; shell the ear and find the weight of the grain; divided the weight of grain by the weight of grain and cob, and the result will be the percentage of corn.

A large proportion of corn grown averages considerably less than the average given, a number of varieties, as the result of years of careful breeding, exceed the average percentage. While it is desirable to grow corn giving a low per cent. of the cob there is a point beyond which it is not safe to go. There seems to be a proper proportion or relation existing between the corn, and the cob bearing it, and beyond this point the breeder cannot go without seriously endangering the vigor and constitution of his corn.

GLEANINGS FROM FIELD WORK IN ONTARIO DURING THE PAST SUMMER.

By T. G. Raynor, Seed Branch, Department of Agriculture, Ottawa.

I want to call attention to a feature of our exhibit which is educational, and I would like to know why some such system as we have for showing the grains should not be used by Agricultural Societies. It would simplify the work and make it easier for the judge and the people. Another feature that we have in our exhibition is boxes in which grain has been sown, such as barley, wheat and peas. It illustrates the different kinds of seed sown; some plump seed, small seed, shrunken seed, and broken seed; and in the case of peas weavily seed, showing the advantage of careful selection of seeds.

It has been my opportunity to visit a number of farms where they have improved their grain by hand selection. One man is doing this with Red Fife wheat. The year before last he had about ten acres of improved seed, the product of hand selected seed that he had been growing according to the plan laid down by the Canadian Seed Growers' Association. At the time of my visit just before harvest I would say it was easily good for twenty-five bushels to the acre. I have since found out that it has yielded a little more than that. That man was offered by his neighbors one dollar and fifty cents ($1.50) a bushel for that seed, but he would not take it. I asked him why, and he said because last year his seed was badly smutted. He had been following up selecting seed for five or six years. He had taken out some stable manure and put it on a piece of his improved seed plot, and right there you could see where every drop of that stable manure had been scattered; and the reason of that was that it had held the moisture, and you could see right to the mark where the timothy left off and the pea stubble began.

Q.—Was this manure put on top?

A.—Yes, taken out after the crop had been sown and scattered over the surface and then allowed to remain there. It was fine manure, the sweepings and scrapings of the yard.

I also visited a crop of oats, two acres of as uniform and even lot of oats as I have ever had the privilege to see. It would yield about seventy-five bushels to the acre, and he told me he had noticed a visible improvement since he had been selecting his seed.

Another gentleman in the vicinity of Ottawa who has improved the Banner oats had about four acres that lay right along the roadside, and it was remarked by all who passed what an even piece that was, and certainly it was just almost as level as the table for the whole four acres and the yield would be about sixty bushels to the acre.

Another gentleman has been improving the Red Fife wheat. He has been following up the work for six years, and he feels it has paid him well.

Another man has been improving Compton's Early corn, and it has shown marked improvement. He bought some seed and grew alongside of his selected seed, and the seed he bought from the dealer had the best chance so far as cultivation was concerned and has an application of stable manure; but the crop from his own select seed of the year previous was standing up two or three inches higher than the other. They were both planted at the same time.

I visited another corn plot, and the farmer told me a heavy rain came up when it was half planted, and the other half was planted three or four days after, and you could see to the mark right where he left off planting. The growth was three of four inches higher, and he said there was a far greater yield on that which he had planted previous to that heavy rain storm as compared to what was planted a little later.

Another corn plot in the same vicinity was easily 10, 11 and 12 ft high, but the striking feature of that crop was that it had a large amount of smut present all through it.

Another corn experimenter who had been selecting corn all his life could scarcely be convinced that he could make a selection from the best ears. This year he selected from the best ears out of the whole bunch, enough to plant eight rows, and he planted these right alongside of the others, and he said he could scarcely believe his eyes when he saw the improvement in these eight rows.

Another plot of sweet corn it certainly was a sight to see. It was as even as could be and a rank vigorous growth; nearly every hill was in its place, and it gave promise of a very large yield showing the great advantage of selecting the seed.

These are some of the principal things that I noticed in my trip of inspection that I thought would be of interest to you. If they are worth knowing I am very glad to have had this opportunity of placing them before you.

HOW THE RECORDS OF THE CANADIAN SEED GROWERS' ASSOCIATION ARE KEPT, THEIR UTILITY AND PURPOSE.

By L. H. Newman, Sec'y. C.S.G.A., Ottawa.

During the following sessions of this Fair we will doubtless hear of the breeding of live stock, the principles of which are now coming to be pretty well understood. With this growing knowledge of these principles there has come a corresponding improvement in the various breeds of live stock to which they have been applied. Breeders of live stock have recognized in a general way for generations the importance of breeding from specially desirable parents. This is simply a recognition of the fundamental law in breeding that "Like produces like." This is also the basis of pedigree, which is merely a record of ancestry, be it good or bad. It is because men expect a good animal *from* a good animal that they wish to know the sire and dam, the grandsire and granddam, etc.; hence a genealogical record is kept of the descendants which have sprung from a certain individual of marked superiority and which was taken as the starting point. Unfortunately, however, the descendants do not always maintain the excellence of their ancestors. They may have been neglected and poorly fed, which has resulted in loss of vigor and quality. In plant life we would say that the strain had "run out." It is therefore apparent that pedigree in animals is by no means a proof of merit, unless the individuals composing the ancestry were all superior animals, which as we have noticed is not always the case. Hence it is essential that individual merit be looked for as well.

The term "pure-bred" is applied to animals to denote purity of breeding. Pedigrees in its broader sense, however, does not necessarily denote purity of blood, since grade animals may also have pedigrees. Such pedigrees, however, are in practice seldom kept unless they denote utility, as when records, say of the capacity for milk giving, are kept by private owners of grade herds. Pedigrees are now generally kept in some public record commonly known as a "herd-book" or "stud-book." The main objects in keeping public records are: (1) To preserve the purity of the breed and to furnish the breeder with a guarantee of purity of breeding. (2) To guard against the private issuing of manufactured records by designing breeders. In public records no fact can be stated that is inconsistent with what is already recorded. (3) To furnish a ready means of tracing pedigrees.

Let us now turn to the plant kingdom and see how far these principles may apply. At the present time we have a great many different classes of farm crops, and of these we have an endless number of different varieties. Whence came all these varied forms? What are the methods employed in securing them? Practical gardeners, farmers and stockmen know that Darwin discussed facts and principles vitally related to every day farming. This great scientist, whose work has become the basis for all similar lines of work, showed how breeds and varieties originate and change from one to another. The changes which occur in plants and animals in their wild state are due to the "struggle for existence" and the "survival of the fittest." When our plants were brought under cultivation by man, and when our animals became domesticated, the former rapidly subdivided into many forms which we for convenience term varieties, while the latter subdivided into breeds. The different varieties and different breeds which now exist have been gradually developed by the accumulative power of man's selection to suit the different conditions in which they are asked to live. The success with which the process of selection has been applied by man in making his breeds of animals is well known. Selection acts only by the accumulation of very slight variations—the process is cumulative and man's power in accumulating may be said to make the wool of one sheep good for carpets and another for cloth; one beet good for the manufacture of sugar and the other for feeding purposes. While the process of selection, both natural and artificial, is largely accountable for the great diversity of forms both in plant and animal life yet there are times when the desired result cannot be obtained by simple selection. Then it is that in plant improvement hybridizing is resorted to as a means of obtaining the desired end, which is a new variety.

There is a fundamental difference, however, between plant and animal breeding which it would be well to notice. In animal breeding the production of new races is very rare. Ordinarily the improvement sought in animals is improvement in size, quality of beef, milk production, etc., which is accomplished by means of judicious mating followed by careful selection and handling. Plant breeding on the other hand, as *generally* understood, consists in the production of *new* varieties which correspond in degree of difference to the different breeds of cattle. The plant breeder handles thousands of individuals where the animal breeder handles tens, and while the farmer cannot register individuals as does the latter, yet he does name groups or strains. In plants, therefore, the basis of improvement is generally a *group*, while in animals it is a *single individual*. In both cases, improvement is governed by the same natural laws, and the improved strains of plants must likewise have had their origin in some remote individual or group.

In animal breeding the presence of two separate individuals, the sire and dam, are necessary before offspring can be produced. In plants such as wheat and oats, on the other hand, the sire and dam, so to speak, are included in the one head, and perform their natural functions there, which act results in the production of offspring, which is known as "seed." Hence each plant may reproduce itself in season and independent of outside aid. Where one plant is crossed upon another it is done simply with a view to developing a new race or variety combining the good qualities of the parents. The act of hybridizing breaks up the type, causing many hybrids of different types, and making it possible to finally select the type for which we are seeking. Fortunately, much improvement may be made *within* the race without hybridizing by simply selecting the most coveted plants—those plants which show themselves to be most capable of thriving to best advantage under their respective conditions. Hence, since the male and female are to be found in the one plant, we can breed up our plants by selecting for seed purposes seed from those plants which we consider most suitable as parents.

In the past it has been the custom to secure our seed from the bin, and screen or fan it out, taking the largest kernels for seed purposes, giving no thought to the plant which produced it. In other words the individual has been considered while the pedigree has been ignored. Since the same laws prevail in plant life as are taken into account in animal life, it is just as important that both pedigree and individuality be considered here if we would realize best results. Many instances might be given to show the degree to which we may be deceived by appearances. That a grain of wheat or an ear of corn is very often not "what it seems" is too true, and this fact demands that we go a step further and give some thought to the ancestry or pedigree.

This is a problem which the Canadian Seed Growers' Association is endeavoring to solve. Not only does this organization aim to direct the work of plant improvement or plant "breeding," as we shall term it, along approved and scientific lines, but it also aims to keep a record of the performance and purity of the different strains worked with from year to year. The practice of pedigreeing is found to stimulate care not only in the growing but in preventing the mixing of varieties. The importance of the latter is well known to all grain growers. If a pedigree is to be of any use it must represent, first, purity, and second, utility. In animals the ordinary pedigree simply represents lineage or ancestry, while in plants we aim to make it represent both ancestry and utility. It is well known that all crops, or the different varieties of any crop, are not capable of being improved to the same extent. Some varieties are particularly adapted to certain conditions of soil and climate and do not readily adapt themselves to new conditions; while, of course, we are well aware that other varieties seem much more ready to fit themselves to such changes. When careful records are kept of the behaviour of a variety under certain conditions for a few years, and believing that all plants are amenable to the laws of heredity, and that they will reproduce themselves true to type when grown under similar conditions of soil, climate, etc., the real value of a race or strain can be determined pretty closely.

The very complete information which it is necessary to have in order that the records may be of value necessitates a great amount of work. The system by which this informtion is obtained is briefly as follows: After a member of the Association has been well started in the work, and has received all necessary direction from headquarters, he is sent suitable forms to use in recording the performance of the variety with which he is operating. The first form is sent early in the year, and is used to enable him to record certain notes which are to be taken on his breeding plot during the growing season. He is asked to give the following information, viz.: (1) Date of seeding. (2) Amount of seed sown. (3) Per cent. of smut and rust in the resulting crop on the plot. (4) Character of plants. (5) Date when crop becomes fully mature. (6) Date of choosing plants and selecting large heads therefrom. With crops such as corn and potatoes, suitable information is also called for. Later in the year another form called the "Record Form" is sent to all members, in which they record the weight of cleaned seed secured from the hand selected plants; the size of the hand selected seed plot and total yield of that plot; the weight of grain per measured bushel of the crop produced from the improved seed plot; the freedom from other varieties; character of soil on the plot, nature of preceeding crop, and freedom from weeds. During the first few years the actual work of the member is also inspected during the growing season and careful notes taken not only on the nature of the crops and soil, the percentage of rust and smut, the vigor of growth, the method of seeding, weediness, etc., but on the general appearance and condition of the farm as well. The report of the inspector is checked against that of the member, and every opportunity is taken to avoid errors or misrepresentations. Samples of the heads and grain are also sent in and examined carefully, and anything of importance is noted. All information obtained from these sources is recorded in the "Record book" year after year, and in course of time, when results come to warrant it, pedigrees are issued for the seed. According to the constitution of the Association no pedigrees can be issued in any case until the seed has been grown according to regulations for three successive years at least. Since the standards must necessarily be approximate on account of the immense territory covered, the conditions peculiar to the respective districts are carefully considered before issuing any certificates and creditable results with the strain for the locality concerned must be secured for a series of years.

Pedigrees, or as they are called in Association terms "Certificates of Registration," are issued in three classes, viz.: First, for that seed which has been selected by hand from standing plants for a series of years, each certificate representing 10 lbs.; secondly, for the threshed and cleaned seed produced on the hand-selected seed plot, each certificate in this case representing 50 lbs.; and thirdly for the threshed and cleaned seed produced on the improved or multiplying plot. This last is called "General Crop Seed," and is the seed which is used most largely in commerce, each certificate representing 100 lbs. These certificates, to which the name of the secretary must be attached, certify that the seed for which they are issued has been grown and selected according to the rules of the Association for a given number of years, and that it has been accepted for registry in the records of the Association. On the back of each certificate is given the grower's certificate, and the statement of transfer, which is filled out by him before it is transferred to a purchaser of the seed.

While the utility of these certificates has not yet been fully demonstrated, we believe that their use will stimulate to greater care and honesty. We now have not only too much renaming of varieties, but too many common place introductions. Some of these may do exceedingly well under certain conditions, the reports of which success stirs up the all too prevalent variety craze. When given a trial, however, the great majority of these so-called "wonders" prove disappointments, and in the meantime much money has been spent and lost. Better by far to realize good, steady, average crops than spasmodic flights into the realms of perfection one year and into the depths of failure and despair the next.

A strong organization with power to discriminate and keep in check aggressors in this field has a powerful whip to prevent breeders, seedsmen, and nursery men from going to extremes. In order that this organization be able to render the greatest public service it is necessary that the people themselves come to know something of the laws which underlie the origin of varieties, and plant improvement, and that they will grapple with the problem themselves under the intelligent direction which the Association aims to give.

THE DUAL-PURPOSE COW.

By E. C. Drury, B.S.A., Crown Hill.

The dual-purpose cow has been the subject of much debate. On the one hand the special purpose dairy cow advocates have asserted that she is no good for milk, and on the other the beef men deny that she can produce a good quality of beef. Between these two sets of men, each certain of their position, the advocates of the dual-purpose cattle have had a hard time of it. Therefore I feel somewhat nervous about introducing the subject.

In beginning, I desire it to be distinctly understood that I have no quarrel with the special-purpose cow. We do not expect the dual-purpose cow to equal the record of her dairy sister, nor to give quite as fine a carcase of beef as the beef type animal. To do so would be absurd. We do, however, expect her to give a fair profit at the pail, and at the same time to produce calves that can be made into good beef profitably. We admit that the dual-purpose type is not the type for all circumstances, but we claim that for her own circumstances she is a more profitable cow than either of the special types.

The relative cheapness of land and labor has much to do with the type of cattle that is suitable for any particular farm. We have three conditions, in the main, though there are many gradations between them. The first is where we find land scarcer than labor—comparatively small farms, with an abundance of help, often supplied by members of the family. Here it is important that stock shall be kept that will give the greatest return per acre of the land used to support them. I believe dairymen are right when they claim that the special dairy cow will do this better than any other type. On the other hand, we have such country as the ranching country in the Northwest, where land and feed count for very little, and labor is the expensive item. Under these circumstances we would expect the special beef type, requiring as she does, no labor for milking, to be the one best suited to the situation. But, between these two extremes there is a great deal of country not suited to either of the special-purpose cattle referred to, land which is too high-priced for ranching, and where labor is too scarce to handle the whole stock of cattle as dairy cows. A great deal of Western Ontario is of this character. We cannot profitably follow range methods, nor have we the labor necessary to keeping our entire stock of cattle as dairy cows. Under these circumstances it would seem to be indicated that a cow giving a reasonable profit at the pail, and at the same time yielding a calf that can be profitably turned into beef, would be the one best suited to our conditions. And, as a matter of fact, what kind of cattle do we find on these farms throughout Western Ontario? What but the dual-purpose type, or as near an approach to it as the knowledge and opportunities of the farmers permit. We talk of the special-purpose beef animal. Will anyone tell me how largely she figures in the production of the beef of our Province? Our stockers, our feeders, our finished exporters, are the progeny of dual-purpose cows, of cows kept for profit at the milk pail, as well as to raise a calf. Whatever her opponents may say, the dual-purpose cow is here, and here to stay, and it behoves us to make the best of her.

What is the best breed to use for the production of dual-purpose cows? To my mind there is only one breed for this purpose,—the Shorthorns, a breed that, while attaining the highest excellence as producers of beef, have at the same time retained their milking qualities to a very large extent. The Shorthorns have now their place in the world largely because of their dual-purpose characteristics, and they stand pre-eminent in this regard. So I would say, if we would have dual-purpose cattle of the right type, we must use Shorthorns, or Shorthorn grades. But just here a serious difficulty confronts the farmer, in the inability to secure sires of the right type. Our breeders of pure-bred Shorthorns have been in many cases, so carried away by the desire for show-ring honors in the special beef types, that they have entirely neglected the milk-producing characteristics of their cattle. The result has been in many cases the production of an animal just as far away from practical utility as is a pouter pigeon. That seems a strong statement to make, but it is true. I have seen in the stables of importers of Shorthorn cattle cows that were dry at eight weeks after calving, their calves being reared by nurse cows. I say such an animal is no good at all. The function of a cow is not only to produce a calf, but to rear him, and a cow without milking characteristics does not do this. But the breeding of animals of this type has had a very bad influence, on the dual-purpose grade Shorthorns of the country. Because farmers have found from experience, that the heifers obtained from bulls of the extreme beef type of Shorthorns, are poor producers of milk, they have been led into several mistakes. In the first place, not knowing what to look for in a heifer for milk-production, and finding the extreme beef type poor at the pail, they have selected heifers as far away from the beef type as possible, thus injuring their herd's beef-producing qualities, and not always obtaining milk-production. Another and worse practice has been the introduction of dairy blood on the side of the sire. This may give some improvement in milking qualities, but utterly destroys beefing qualities.

The best future of the beef industry in Ontario, to my mind, will be found in an intelligent selection by the farmers of heifers that show qualities of merit in both directions: the good strong back, and thriftiness of the beef animal, and the good udder and milk-veins of the milker. It is possible to get heifers of this type. Then, if we use on these, pure-bred sires from families whose milking qualities have not been altogether neglected, we will obtain good results. In closing, I would like to urge on breeders of pure-bred cattle the desirability of supplying bulls of this class, and upon farmers the necessity of knowing what to look for in their heifers in order to obtain good results in both beef and milk.

Q.—I would like to know what success the young man has had in turning these dual-purpose cattle into money?

A.—The dual purpose cows that I keep, are some of them pure-breds and some of them are grades, and at the milking pail the year before last they earned $48 on the average, and their calves at three years old will weigh 1,400 or 1,500 lbs., without any extra feeding, and that gives me a very fair profit; the calves will earn $20 to $25 a year, and the cows will earn $40 to $50 a year.

Q.—What characteristics do you look for in a dual-purpose sire?

A.—These are long questions to go into. I would look for a dual-purpose mother and dual-purpose grandmother.

Q.—Is it worth a man's while to go out and buy stockers?

A.—I have neighbors who say it is; because it saves them the bother of keeping cows. I have another neighbor who says he would rather keep a cow and raise a stocker to two years old. If I could raise all the calves I needed I would not buy, for two reasons. In the first place, competition is such that we have to pay too much, and in the second place I cannot get as well raised cattle as those I raise myself.

Q.—What would you do if you could sell your milk at 12cts. a gallon?

A.—I cannot answer that.

H. S. Arkell, Lecturer in Agriculture, O.A.C., Guelph: I feel rather at a loss as to how to commence. I do not quite agree with all that Mr. Drury says, but he is rather a heavyweight to combat as a speaker and practical man. There are some things, however, I should like to take exception to. Mr. Drury says he was much disappointed with the stockers produced from the use of Shorthorn sires. The point I wish you to consider with me is this, that at Chicago three breeds—the Angus, Hereford, and Galloway—have never been known as dual-purpose cattle, yet we find that the best animals are brought forward from them, and were sold in carload lots at the top of the market, and the men on the American farms find that they make money out of that kind of cattle. I do not know that all the Shorthorn breeders in this country have forgotten the milking strains in their cattle. One of the best known Shorthorn breeders in Scotland considers the milking qualities of his cattle, and we know for a fact that they have found a ready sale wherever Shorthorn cattle are known.

I should like to mention a breed not known in Canada—the Red Polls. I was much interested in the Red Poll cattle at Chicago. They seemed a little out of place there. Prof. Day told me when he was at the Royal Show in the old country he noted that the Red Polls were judged largely from the standpoint of beef production, but that the dual-purpose qualification did not receive much attention at the hands of the judges. At Chicago a judge there said, "I will not put a cow to the front unless she has a good udder." It would seem that it has scarcely ever been possible to find judges in agreement as to what should be considered the standard of merit in dual-purpose cattle. Further, steers from Red Polls did not bring the price other cattle brought. I would like to ask Mr. Drury if he would advocate that the farmers of Ontario should go to this limit in breeding dual-purpose cattle.

Mr. Drury: I am not familiar with the Red Poll cattle. I have seen very few specimens of them. I said in my address that there was no doubt a high quality of beef could be made from the special-purpose beef animal; whether it would pay is another question. We have to supply an ordinary export market, and we have to consider the question whether it would pay us under the conditions as they exist in Ontario. On ranches they have another set of conditions, but I question whether we can afford to keep a breed where the calf on growing into beef would have to pay his mother's board as well as his own.

Mr. Arkell: I was looking at these classes of export bullocks being judged this morning, and I thought we had not reached the standard of cattle that they have on the other side. I fully agree with Mr. Drury in what he says that the milking qualities of the beef breeds should be considered, particularly in the case of the beef breed that finds favor in Ontario, and, as a matter of fact, prominent breeders of Shorthorn cattle do keep these carefully in mind. A cow that will not nurse her calf will not make a successful breeder, but we can at the same time keep the beef question as the first consideration with the prospect of producing steers that will command the highest prices on the export market. I am fully prepared to admit that the second consideration should be, however, the milking qualifications of the breeding cows.

JUDGING BEEF CATTLE. (ILLUSTRATED.)

By John Gosling, Kansas City, Mo.

I enjoy an audience like this, and I enjoy the Canadian people, because there is an anxious look on your faces. I have been so thoroughly entertained that it gives me pleasure to try and entertain and instruct you for a short time. This steer (indicating) is one that was in the last ring of the show, and the competition was for the best export steer. Some of you heard me say this morning that twenty-five years ago the idea was that if they would send mountains of beef from America to England, they would accept it, and that the English people would eat more fat than the American people, and at the time they could not get steers too fat; they exported these mammoth steers from Chicago to London, England, weighing a ton. The price at that time was about 7 cts. a lb.; the weight of steers gradually came down from a ton to 1,900, 1,800, 1,700 and 1,600; now a 1,400 steer or heifer is fairly acceptable in the English market. If there is too much tallow there is too much waste. Suet used to sell in England at the same price as steak, and there was a great scarcity of it in the native beeves forty years ago, but since that time the great packers in the United States of America have been making butterine and oleomargerine, and there is a probable decrease in the price of suet, and when a person buys a roast or a steak in the United States he says, "Throw me in a piece of suet." If a man buys a steer that dresses 1,200 lbs., and he has to sell a lot of that meat at 2½ cts. a lb. he won't remain in the business very long. I asked the owner of this steer his weight, and he said about 1,350 lbs.; he will be two years old in March, and when you get them up to 1,350 at 20 or 21 months old you have been giving them something, and when they have responded like this steer has they are going to give you something in return. Breeders should never get away from straight lines in cattle. Have a straight top, straight bottom line, straight side line as near as possible. There is just a little downward tendency from this steer's hook bone back, but that is redeemed by the form of the hind quarter whenever hung up.

There is one thing that attracts your attention to this steer, and that is the richness of his coat; there is quality under all such coats of hair as that; it never fails. If there was anything that marred the beauty of the Champion steer, it was a little tendency to coarse hair; his hair was rather long and coarse, compared with this one. What do you find on the Galloway? Long and coarse hair. What do you find on the Welsh runt. Long and coarse hair. If you have ever eaten an orange, you have found that some of them were dry, because the coarse meat of the orange will not hold the juice in it. This applies to coarse grained flesh. I know before this bullock is killed, that he will have fine, textured flesh; it will be fine in the grain, and undoubtedly, nicely marbled. I can tell that from handling and the pliability of the hide. If I run my finger up the hair of a steer, and it resents my fingers, and some of them are like slivers, I know that steer has coarse meat.

Just look at the head of this steer; there is nothing coarse about that head, he has an almost effeminate head, a bright eye, and is nervous and modest and backward, because he would not come in at the door. (Laughter.) He is not a forward, bold chap, not by any means, but he is forward at his feeding. Look at that face; physiognomy has a good deal to do with a steer. Look at the expanse between his eyes—his brain box; that tells you he is intelligent and has refinement. There is not too much length from the eye down to the nostril; he has a typical Shorthorn head. Judging this animal the first point to be looked at is his tongue root—the ball of fat—and whenever it is there, you can calculate the animal is ready to kill. You see how nicely his head is put on to his neck; he does not have a long neck like you find in the Jersey, or in the milking breeds; they are not built for anything but a milking machine.

Then you come to the collar, and here is another illustration of what I spoke to you about. With the steers in the Champion class, the collar, this little bulge on top of the neck, is known by butchers as the "rose of fat." There is about an inch and a half of fat there right on top, a fat vein on the neck; a boiling piece or the mince pie portion when used. The side is beautiful, as a whole, the shoulder-point does not protrude like some, so that you can almost hang a set of harness on, but it is neat and well covered.

Then you come to the shin bone or soup bone; flesh comes right down to his knee. In other words, he has plenty of muscle, and that signifies plenty of lean throughout the carcass. When you see the muscle big, you will know that the flesh will be big. Come along the vertebrae, and you will find that there is a covering of half an inch of beautiful white fat. I know it won't be yellow. Cattle that are cared for as this one has been, do not turn out yellow or high-colored fat. Whenever you see a piece of beef on the block that has nice white fat, you can count on it being young and tender.

Now look at the spring of his rib. It is beautiful. It is not flat-ribbed at all. There is a roll of fat about an inch and a half to two inches, and he is closely ribbed up. He is like a Percheron horse, ribbed up close indicating an easy keeper. We find plenty of depth of flank. I come on back here, and we find the distribution of the layer of fat from the bone of the hip to the end of the rump bone is splendid. It could not be better; and there you have got two inches of depth. The outside of the thigh is as it ought to be, not bulged out but straight down. The thigh beef or the round of beef sells for the same price in the country town, in our part of the world, as the loin does; but you go to the city butcher and he will say 10c. for round and 22½ for the loin.

What men should cater for, are such steers in build or form as the Champion steer, that you can turn up-side-down and have no more bulge than you have on top. That is the kind we are looking for: such that dress a big per cent. net to gross; but they are pretty hard to find. The deeper the body, the more coarse the beef, because you only go a certain distance with your rib of beef. We are governed more by percentages than ever and the test for results; *i.e.*, more weight in high priced parts the better. My experience as a breeder and butcher for thirty-five years taught me that.

There is another point we do not want to overlook, and that is the brisket. Old men that I have known for forty years will cling to a piece of brisket, but I have never found any comfort in eating it. We look at some steers to-day with a brisket as big as a fifty pound sack of flour. It caused comment between Mr. Gibson and myself, simply because a flabby profuse brisket is waste from a butcher's standpoint. A breeder's opinion is different, and to some extent the breeder has specific ground for admiring it. The black people in our part of the country, would be insulted if you sent them ten pounds of it, because their ambition is to eat chicken.

If you want your animals to win in the show ring in the younger classes give them milk and cream and butter and everything. Feed them well on the start, and as I told a man who spoke to me about it, if you do not want to give them milk, give him sugar. He said, "I am giving him black-strap now," and I said, "All right," I never had any only when my father gave it to me." (Laughter.)

Q.—What do you say as to his bone?

A.—The bone is just right, I would not want any lighter or any heavier.

Q.—What improvement would you put on him to make him an ideal steer?

A.—I would have him come out a little straighter from his hook bone back.

Q.—Could you not get them too square?

A.—Yes; you can get them too square. There is just a modest turn or droop of rump some would say low quarter that does away with that square hind quarter when slaughtered.

Q.—What about his shoulder, is that perfect—the top of the shoulder?

A.—Just as nice as it can be. Do not get the crop mixed with the chine. This steer is fat enough, and has a wonderful amount of flesh right in there. He has got as much lean in his rib as some of those heavier ones we admired to-day. I recall one steer that was killed at a Fat Stock Show, The Chicago International. He was a Hereford that reminded me of a Leicester sheep. You know the Leicester has not got much lean along the back or any other part of the body. (I do not think you have had very many improved Herefords in Canada. They had one very good bull at your College a year or two ago named "Spartacus.") Well this particular steer was fed by John Letham, a young man who studied at one of the colleges in Canada, and he said to me, "He has the best flesh I ever had." I said, "When he is killed you will run like a scared dog." And when he was killed there was not more lean in that rib of beef than what you could see between the space of my thumb and finger, and I could not get Mr. Letham to go and look at him. He said, "I have heard of it." It was really two-thirds fat and one-third lean.

Q.—I am afraid you are leaving the impression that it is just as well for an animal to be thick over the chine and crop?

A.—In proportion with the body throughout; isn't he as heavy right through here? And he has half an inch of spine fat covering throughout, enough to grade his carcass choice; half an inch is as much as you or I want.

SHEEP REARING.

A number of reasons most commonly advanced by farmers for not keeping sheep on their farms were discussed under the following headings:

(1) "That Sheep are not so Profitable as Other Classes of Live Stock."

(2) "That Sheep are Hard to Fence in."

(3) "That Sheep Crop Pastures too Closely and Foul it for Other Classes of Live Stock."

(1) THAT SHEEP ARE NOT SO PROFITABLE AS OTHER CLASSES OF LIVE STOCK.

By Robert Miller, Stouffville.

I am in a peculiar position this morning; because I am a witness for the defence, and it appears from the programme, that I should be on the other side, and appear as a witness for the prosecution. Before beginning with the real subject under discussion, I would like to offer my congratulations to the Agricultural College, on the great success they attained last week in the judging competition in Chicago. (Applause.) I would also like to congratulate the sheep breeders and the cattle men of Ontario, and particularly the horsemen of Ontario, on the great successes they won in open competition in the Chicago exhibition. I can assure you that it is a wonderful thing, that in two of the most important classes, Clydesdale, and Hackney breeds of horses, Ontario men alone sent representatives of their studs into the ring to show for the champion prizes.

I have been so busy, because sheep are so profitable in this country, that I have not been able to sit down and give this matter full attention. I believe there are not many reasons why sheep are not more generally kept by the farmers of this country, and why they are thought not to be so profitable as other breeds of stock. I believe the general reason is, that too many men think that sheep are too small a thing for them to waste their time upon. When times are good, farmers will buy horses in preference to almost anything else, and we have far more so-called breeds of horses than any of other class of live stock, but at the same time, there are very few genuine breeders of horses in the country. The moment times begin to get hard, and we begin to feel that financial pinch that comes to us in every cycle of years, then you see the farmers go back to the sheep. This is always the case, whenever cattle are high in price, sheep are sure to be low in price, and whenever cattle and horses get low in price, then sheep begin to be appreciated, and they become valuable. It is most difficult for me to give evidence as to why sheep are not profitable; because in the experience I have had, and the experience of the men I have known, we have been successful with sheep. It is over seventy years since my father founded the flock we have at home, and I have heard him say many times, that he never knew a year in his experience when his sheep did not pay him a profit. There has never been a year in all that time, that our sheep have not made a return on the proper side of the bank account. There have been plenty of years when we could not make our cattle pay, and there have been far more years when we could not make our horses pay. There is nothing that will lose a man so much money in bad times, as high class horses. We can feed five sheep for the same price that it costs to feed one horse or a cow. If you will sit down and carefully figure it out, you will find that five good sheep will make more profit than the average cow that is kept on the farm, or the average horse, and one man can take care of 100 sheep much easier than he can of 20 cattle or horses.

Some people seem to think that if they spend any time attending to their own business, that time is lost. They seem to be always wanting to look after other people's business. I think it is a good plan to look after your own business, even if it is sheep you are looking after on your farm. Some people have the mistaken idea that sheep do not require attention; they will be better for a little kindly attention, even if they are out on pasture. They do not need as much as other stock, but they do need some attention, and they will repay you for what you give them.

With regard to the kind of sheep a man should keep, I do not believe there is very much difference. I have some radical notions of my own, and perhaps one of them is that I believe there is not much difference in the breeds of sheep, I believe the most important thing is to have good representatives of the breed, and then pay that attention to them that they require, in order to make them thrive well, and if we do that, there is no question that we will find plenty of customers amongst our neighbors from the other side of the line. The men in the United States that have money keep jumping from one class of stock to another, all the time. They have not got the stability that we in this country have. When cattle become dear, every man in the United States must have cattle the next day, or there is going to be trouble. When horses become high, every man is bound to have horses. When horses and cattle go down, and sheep are selling pretty well, then every man makes a desperate effort to get sheep. It has been so this year. Although horses have been selling for a big price, cattle have not been selling so well; but at the show, men were almost fighting to buy old ewes, in order to take them into their breeding pens to lay the foundation of a flock of sheep.

Sheep, like anything else, pay better when times are good, but they will make a profit even when times are bad. I might cite you a few cases to prove that sheep are a paying commodity. There are no men who have lived a more careless life in business, than the sheep men of Australia, and there is no class of men on the face of the earth, that have had more pay for the time they have spent in the business.

Great fortunes have been made there. They have had great droughts, but nearly all the sheep men in that country have laid up so much wealth from the breeding of sheep—and not very good sheep,— that nearly all of them have very large bank accounts, and they can stand the losses they have suffered in poor years. And it is the same with the sheep men of Africa. I know a man who makes sheep dip who got an order amounting to £70,000 or $350,000 worth. He got an order with that much money attached to it at one time, for sheep dip, to be sent to South Africa. Then look at England, and you will see sheep men living on land for which they are paying a high rent, and they are able to pay their rent and their taxes when other men were not able to pay the rent that the landlord exacted from them. The sheep breeders have always been prosperous and they are, perhaps, the most prosperous body of farmers that are in existence in any place in the world.

There is no country in the world where they have more bleak land than in some parts of Scotland, but even on that poor land sheep breeders have become well off, and they make a splendid living under their hard circumstances. They have sheep adapted to their own particular style.

So far as this country is concerned, I do not think it is necessary to have any particular breed of sheep, but there are some districts where some of the heavier breeds will do better than others. I believe the proper thing is to have a few sheep on almost every farm, because they will find their own living and you will never miss what they eat. They will clean up weeds in the fence corners. I think it is of more importance that you be careful not to overstock your farm than it is that you keep any particular breed. I have never known a man who is a sheep farmer to fail in business. That is a pretty strong statement to make.

Q.—Have you had any trouble with maggot in the head?

A.—No; I believe the fly is becoming extinct in our district. I believe that draining the swamp land has caused the fly that lays the egg in the nostril of the sheep to become extinct. I have not seen a case of dizzy head in our district for over twenty-five years. We have stomach worms and lung worms. I believe sheep ought to be drenched with something twice a year to take these worms out of them.

Q.—What about tape-worm?

A.—We never have it in our district.

Q.—Did you ever have sheep with scab?

A.—Yes, I have had that; we are not supposed to keep them. I buy a great many sheep, and if they come from a district where there is likely to be scab, I quarantine them. I never had but one case, and we noticed it while it was in the quarantine.

Q.—Do you dip your lambs?

A.—Yes, we dip every sheep we have twice a year; we have an ordinary dipping vat, and everything goes through the vat.

Q.—What time of the year do you dip them?

A.—Just as soon as they go out in the spring, and before we put them into the pen in the fall.

Q.—Don't you think sheep running on the same pasture year after year has something to do with their health?

A.—Yes; if you keep sheep on the same pasture every year you should not keep very many, because they are bound to develop disease. If the sheep eats all the weed seeds on your farm, you can be sure they will not grow again, and while the sheep kill all your enemies, the weeds, they do not kill their own enemies. I plow all my land. I do not think any land should be kept in grass more than two years.

Q.—How many sheep can you keep on a 100 acre farm?

A.—That depends on the class of your land. I believe if you have a gravel sub-soil so that everything will drain through the ground, and there is no danger of water standing on the land, you can keep a lot of sheep on it, all the sheep that it will feed, and it will never become foul or poisoned. On the other hand, if you have a close soil that is difficult to drain, a heavy clay, then I think you ought to keep very few sheep. You should not keep more than 20 or 25 sheep on 100 acres of clay land, but if you have 100 acres well underdrained, then I think you can keep 100 sheep to good advantage.

Q.—What will keep dogs away?

A.—That is something that our Legislature ought to be bold enough and honest enough to deal with.

Q.—Suppose the ewe dies and leaves the lamb, what is the best way to give it to another mother?

A.—The best way is to make that sheep think it is her lamb. I remember one case where a very valuable ewe had two lambs, and she died. I went to a neighbor and paid a good price for a ewe, and I covered the lambs so that she could not smell whether they were her lambs or not, and she took to them kindly. That is a matter that needs care. If it is a strong lamb, it will soon look after itself.

*(2) THAT SHEEP ARE HARD TO FENCE IN.

By Jno. Jackson, Abingdon.

It is hard to understand why it is that sheep are constantly on the decrease in the Province of Ontario. I read in the paper not long ago, that we had not as many sheep as cattle. The Government has been trying to pry into the matter and no good reason has been brought forward. But one reason give is, that they are hard to fence in. A good many years ago, before there was any effort made to improve the breeds, it was pretty hard to fence the sheep with the fences we had in those days. But to-day, there is no trouble, because we have good fences. There is a good deal in training them. If you keep them alongside a poor fence, or out in the road where the neighbors have poor fences, and keep them half starved, they are likely to go through the fence.

The Southdowns are considered to be the hardest sheep to fence. I have kept them for forty-five years, and I have never had a sheep inclined to be troublesome about the fences. There is a good deal in the kind of fences. The old rail fence may keep back horses and cattle, and not keep back sheep, and you can make a fence that will keep sheep very well, and still would not keep horses and cattle. Fence makers say a fence is horse high and bull strong, and hog proof, they never mention sheep. If it will keep, out the other stock, it will keep out sheep.

One year I had a field with a couple of acres of roots alongside of it, and it was not fenced off, and I happened to have some lumber lying around, and I drove stakes, and put one 10 inch board about 8 or 10 inches from the ground and not one sheep went over it. Another time, I wanted to make a fence and keep them from another field, and I took two six inch boards and tacked them on stakes in the same way. Of course the lambs were small. These were exceptional cases, and it would not keep them under all circumstances. As long as they have plenty of feed there is very little trouble.

The cost of keeping sheep is very little, and they do a lot of good on a farm, in eating up the weeds and waste grasses. I think the best fence to put up to-day is the wire fence for any kind of stock. I think it is very unwise to use a bad rail. If you have a rail that is likely to go down in ten years, it is best to throw it out. They are worth about the same for wood as they are in a fence. A poor rail in the Russell fence is a bad thing for

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a sheep. I can build wire fences for the sheep alone, at a cost of 20c. a rod, counting stakes and everything. I would not use posts, I would use a good strong stake.

We have a fence that cost us 55c. a rod, and it is good for anything. We have another 8-wire woven fence that cost 24c. a rod after the posts were set; this paid for the wire, one barb wire on top, 2 No. 9 and 5 No. 11, hard steel coiled wire, and the cost for man with machine putting it up, staples, &c., this is called the "London Fence." Of course it is only top and bottom wire that is No. 9 wire. All No. 9 would cost about 7 cents more.

In building wire fences, I never weave in the top wire; I prefer a barb wire for the top, because it keeps them from rubbing. If it is a smooth wire, and if it is woven in, they lean over the top of the fence, breaking down your stays. An 8-wire fence can be built for from 25 to 50c. a rod, that will keep out anything. For a sheep fence alone, I would not put more than four wires. They will not jump at a wire fence. You could build a fence for $1 a rod that will keep the sheep in and the dogs out. To do that, you should build it 11 or 12 wires high, and put brackets on the outside and use barb wire at the brackets.

Q.—At what distance do you put your posts apart for the high fence?

A.—Twenty-five or thirty feet. Our own are 24, I would put them 30.

Q.—Why not put them 40 feet?

A.—You can make a right good fence 40 feet, and then stake in between each post, especially if you use heavy wire.

Q.—Is spring wire the best?

A.—Yes. If you take a straight wire and put it up tight, the frost will contract it, and when it comes to warm weather, it will all hang slack. We have a fence of this coiled wire, it is up seven years, and it is just as straight now as ever it was.

Q.—Did you ever try cement corner posts?

A.—No, but I believe it would be a good thing.

Q.—Is there any difficulty in putting a piece of plank on each side of the post?

A.—It takes us half a day to put down one of these posts. At the bottom, at the back side of your post, put a piece of plank 2½ feet long, and then near the top of the ground on the other side, put on another piece of plank and then pack it all in good.

Q.—That plank will rot in a very few years?

A.—Use a piece of good oak plank. Another way is to take an ordinary post, and then take a big stone, and dig a hole on the other side of your post from where your fence is going, and then take a good strong wire, and wire it around the stone, and around the top of your post.

*(3) THAT SHEEP CROP PASTURES TOO CLOSELY AND FOUL IT FOR OTHER STOCK.

By H. S. Arkell, O.A.C., Guelph.

The subject that is assigned me is a rather difficult one to deal with. It recalls the warfare which used to exist between the sheep herders and the cowboys of the western ranches. The cowboys were accustomed to accuse the sheep men of leading their flocks to the best pasture on the ranches, making it practically useless for the cattle that followed them, and we have read that the cowboys frequently rode their horses through the flocks of sheep, killing them right and left and sometimes also would drive whole flocks over the precipices.

Some time ago sheep were kept in large numbers in Eastern Ontario, but now they have given place to dairy cattle. Travelling through there but lately, I asked the farmers how it was that they had given up sheep raising, and they stated that they could not manage dairy cattle and sheep at the same time.

We may grant that there are cases where probably the sheep may be accused of cropping the pasture too closely, but I do not know that the sheep are any more to blame than other classes of stock. I think that the fault lies often with the farmer in turning out his animals too early in the spring before the pastures have a chance to get well started, and to get so firmly established that the animals do not injure them in tramping over them. If the animals were retained in the stable for a couple of weeks longer, we should have far less trouble. We aim to get the sheep out in the spring as early as possible, but we usually put them in some pasture where we do not mind that they injure the grass. It does them good to get a first taste of the fresh soil early in the spring, and by providing a little paddock for them somewhere near the barn, it is an easy matter to keep the flock contented and healthy until they may safely be turned out permanently into the pasture field.

Another case where the sheep will make use of the pasture at the expense of other animals is where the farm is over-stocked. One year on our own farm we were over-stocked with sheep in July and had to hunt around for a place to pasture our cattle. Where pasturage is scanty, sheep crop it a little closely and leave little for the other stock, and, therefore, I think we should aim to estimate the number of animals that the farm will maintain throughout the year and guide ourselves accordingly. During June we find little trouble, because then pastures are most luxuriant, but towards the latter part of July we find that the pastures have failed a little, and then we must look around for something to supplement what we have already provided. It seems desirable to keep sheep moving from one pasture to another, and as the ordinary pastures begin to fail about the time that the lambs may be weaned, it is our practice then to turn the lambs on the second growth of clover which is usually ready about that time. We do not let them run over the whole field. We run a line of hurdles across the field and divide it in that way, and on half of the ten acre field we can run a goodly number of lambs.

The ewes after the lambs have been weaned will do best on dry pasture. We like to check their milk flow as soon as possible. Ewes do not

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need a great deal of feed for a month or two after the lambs have been weaned, and we allow them to run in the stubble or any place where they can pick up weeds, and that is the time when the ewes on the farm do most for the farmer by eating down the weeds. We plant a field of rape about the middle of June so as to have the rape for fall pasture for the lambs. That will keep them in good health and there will be less danger from disease. We plant the rape in drills and about at the rate of a pound to the acre.

There are two or three things which a farmer might keep in mind in sheep management. First of all, sheep assist the farmer in clearing his ground of weeds, and therefore a few sheep may profitably be kept on every farm. Another point to be noticed is that it is an unwise policy to overstock the farm with any one class of animals, and we must, if possible, keep the number of sheep on the farm relative to the amount of land we have. Finally, we must not keep sheep on the same pasture year after year, because if they are so kept they quickly develop disease. It is wise to have them on cultivated land as much as possible, and at least every two or three years they should be changed to a different part of the farm.

Q.—Did you ever try sowing rape with the spring grain?

A.—Yes, we have done that, but we discarded the practice because, as the shoots of the rape appeared in the sheaves, it was more difficult to cure the grain and we found that the growth of rape did not pay for the trouble that was taken in sowing. The lambs also rubbed the wool off their necks badly in the stubble and that spoiled the appearance of the flock.

Q.—What would be a good live profit on 14 or 15 sheep?

A.—A good average is 6 or 7 pounds of unwashed wool. You will get from 16 to 18 cents a pound for the wool, which will bring, approximately, $1.50. Averaging a lamb and a half per ewe, and at $5 each for the lambs, you will receive per ewe, $7.50. Adding $1.50 for the wool, making in all $9, and you should get fairly within that figure every year.

Q.—When you sell your lambs for the Easter trade have you any trouble with the ewes getting too fat and not breeding the next year?

A.—Sometimes they become over fat and do not breed. Ewes forward in condition we breed earlier.

Q.—Do you not think it is better to breed with an aged male?

A.—Certainly, if you can pay the price for the aged male, but I think with a small flock of ewes you will get very good results from a lamb.

Q.—Your lambs will not be so strong as from a four year old?

A.—The question is may it not be just as profitable when you have a small flock to use a lamb?

Q.—How far apart do you have the drills in sowing rape?

A.—About 28 inches.

Q.—What time do you sow the rape?

A.—About the middle of June.

Q.—Do you sow rape at the same time as corn?

A.—Yes.

Q.—Would it not be better to hold it back ten days or two weeks?

A.—Sometimes we have done that.

Mr. Campbell: I have given up sowing rape with the grain for the same reason that Mr. Arkell gives. I think it is a good practice to sow the rape eight or ten days later, and just roll it in.

Q.—Do you milk your ewes after weaning the lambs?

A.—Very seldom. We put them into a pen after weaning and keep them there 24 hours with no feed except a bit of dry hay. We watch the ewes to see if there is any inflammation in the udders and if there is we draw a little milk from them.

Q.—What is the best season of the year to have lambs come for the general farmer?

A.—Towards the end of March or the middle of April.

Q.—When do you market? ,

A.—We have been dealing largely with pure-bred stock. I think the most successful practice is to sell them in the fall. We have them weigh 100 or 120 pounds in October.

A DISCUSSION OF THE ACT FOR THE PROTECTION OF SHEEP, AND TO IMPOSE A TAX ON DOGS.

John Campbell, Woodville: The three speakers who have preceded me were all given subjects on the practical side of the sheep business. There are comparatively few who see any practical side to the sheep industry in Ontario, at present, or have seen during the by-gone five years. Indications of a great change are looming up on every hand, all pointing to sheep breeding getting its proper place in Ontario ere long.

There are two classes of animals in the Province of Ontario that do not work well together, they are sheep and dogs. The sheep is the animal that is making a good lot of money for the Province. Dogs, on the other hand, are useful to a certain extent, but 1 will say that where you will find hundreds in dogs, you will find millions in sheep, and I would like to ask whether the people in the Province of Ontario are protecting the sheep against the dogs in the way that they should. I think there is a great deal of sentiment in it, and the people are not making use of their intelligence and business capacity in this matter that they are doing in their other lines of business.

The mongrel-bred dog, or mongrels of any other class of farm animal, never gives any profit, but always annoyance and loss.

Second-class may be of some use, but it is the first-class animals that pay best, and the third-class are no good, and we should try and get the Legislature to help us get rid of the plague of mongrel dogs that are such a hindrance to the best paying industry that we have in the Province of Ontario. Some will say, "We have legislation," and so we have. In our municipality a number of years ago the assessor went around and taxed dogs $1 each and females $2, but the next year a petition was gotten up by 25 ratepayers which was placed before the Council, and they passed a by-law so that the Act would not be put in operation the next year, nor any year after. There are so many loop-holes in it, that when we take up the newspaper and read of decisions given by judges it seems we have very little indeed. I am going to give you the opinion of men from all over this Province as to what they state on this question of dog tax.

1. That it should be compulsory upon every municipality to impose an annual tax on dogs.

2. That the tax upon one male dog of a household, should be moderate, say, one dollar, and that the tax for a second male dog and for a bitch should be heavy, some putting the tax up to $5 and even $10.

3. That the money collected in taxes on dogs should always be available to pay for injuries done to sheep by dogs.

4. That the Council of each municipality should appoint one or more competent persons whose duty it should be to adjust the amount of compensation.

5. That the taxes collected by each municipality shall constitute a general fund for the county (or Province) out of which to pay for injury done to sheep by dogs.

Lieut.-Col. ROBT. MCEWEN: I quite agree with Mr. Campbell that the second section of the Act should be struck out entirely. I do not think it should be the privilege of 25 ratepayers of the township to get by-law passed. If the dogs can be kept in the township without being taxed I think it should be compulsory that every township should pass a by-law to collect all taxes on dogs.

Every man that keeps a dog that is not worth paying $1 tax on, I think it would be better if the dog was out of the country.

There is one other section of this Act that I would like to see altered, and that is section 18. I consider the taxes are collected for the purpose of paying for any sheep that are destroyed; it is not collected for any other purpose in the township, and if a man has lost his sheep, why should they only pay him two-thirds of the value?

Mr. MILLER: If they find the owner of the dog, he is supposed to pay the full value, and that would cause any man to try and find the owner of the dog.

Col. MCEWEN. I do not see why full value should not be paid for the sheep. I think that he should receive the actual value of the sheep. There are plenty of people not far from towns who own dogs, and who stroll out in the country and take dogs with them, and very often they go home without their dogs, and the dogs create a great of trouble in the night. Some people won't keep sheep for the simple reason that they are afraid of dogs worrying them, and if these people knew that the loss caused by dogs would be paid in full, a great many more people would go into sheep.

Q.—From what standpoint would you fix the value?

A.—Their breed value. Any man can collect two-thirds the value of a pure breed sheep.

Q.—The majority of the townships have a certain set price of $9?

A.—I do not think it is possible for them to say what the value is.

Q.—I had two sheep killed last year, and I had refused $18 apiece for them, and I got $6 apiece.

Col. MCEWEN: A dog is an animal that I consider has a place on the farm as well as a sheep; any person who has a good working dog, knows his value. The small boy is not always on hand, but the dog will always be there. The dog usually gets more kicks than favors, and the dog will resent it, but if you treat him kindly he will repay you for all the kindness you will bestow upon him. I think it is a good thing to get your sheep used to the appearance of a dog. Take your dog with you when you go among your sheep and get them used to the sight of a dog, and then they will not be so apt to run when strange dogs come into the field. I have no apology to offer for a dog that will kill sheep.

Mr. **Jackson**: I have had some experience with regard to this two-third valuation, and I believe in nine cases out of ten, in our township where sheep have been destroyed, they have got their actual value. They put the value up pretty high, so that two-thirds makes it about right. You might just as well insure a man for the full value of his house as to give him full value for his sheep.

Mr. **Gardhouse**: That matter came up in the County Council of the County of York and was fully discussed, and they seemed to think that if a man got full value he would not try to find the owner of the dog.

Col. **McEwen**: The farmer may be required to make an oath that he did endeavor to find the owner of the dog. If you have an Act, I believe in living up to it, and if a man makes a declaration that he has made a search to find that dog, I think he should be paid in full.

Q.—Why should the owner of the sheep have to be a detective to find out the owner of the dog? Last year in West Nissouri, we collected $328 for dog tax, and paid out $28 for sheep killed by dogs, and I claim the sheep men are not getting a fair deal.

Mr. **Smith**: If the County Council do not pay two-thirds of the full value, you have your action at law. The Act is all right in that respect.

Mr. **Everett**: I have a resolution that has been put into my hands. "In the opinion of this meeting, the Statutes of Ontario should be so amended as to legalize the killing of any dog found at large at any time unattended, and that a copy of this resolution be sent to the Hon. Nelson Monteith, and to the members for action at the forthcoming session of the Legislature." (Cries of "No, no," and "Kill every one of them.")

Mr. **Miller**: I contend there is only one side in that motion. I have two farms where I keep sheep; I go to one farm and I take my dog with me. I would not take $200 for this dog; I paid a big sum for her. She does everything I ask her to do on the farm. I take her to the next farm, and when I get through work on that farm I tell her to go home, and she goes home. Would not it be working a hardship on me if that dog was killed on the way home? Let us be sensible in these things. Let us work for fair things, and when we give that petition to the Legislature let us ask for what is right, and we will get what we ask. We claim that the sheep in this country should have more protection than the dog should have; but you will find that a man will fight for his dog quicker than he will for his sheep. There is no better friend of man than a dog, and sheep are just as true, but they are no truer. I think we should not ask for unreasonable things.

Mr. **Hanmer**: I look upon this tax as a sort of an insurance. The Council of the township of Brantford passed a law that they would not pay to the excess of $8, and where damage is done they will not pay anything unless the sheep is killed. I do not think that is right.

MUTUAL INTERESTS OF THE HOG PRODUCERS AND PORK PACKERS.

By J. H. Grisdale, Agriculturist, Central Experimental Farm, Ottawa.

It is almost impossible to say anything more on this well threshed out subject, but supposing the interests of the country to lie to a great extent along the development of the bacon producing industry, then I think it advisable to consider some of the general points which enter into this industry. The interests of the packer and producer should really be identical. I believe they are identical. The trouble is that we have been watching to see if we can detect the little points where the packer is getting the better of us, and if we cannot find some way in which we can do him, instead of his doing us.

Now, I do not believe he is eternally getting the better of us; possibly sometimes he does us, and possibly sometimes, we do him.

The first point of importance in this subject is that we should produce bacon as cheaply as possible. It would no doubt be to the interest of both parties to develop this industry in such a way as to enable farmers to produce at a very low cost.

The farmers in this country, and the experimental institutions, have for years been doing all they could to help in determining the best methods of feeding, and to find the value of different feeds, to find out which are the most suitable feeds, and the best way to feed them. I believe the packers are just as anxious as we are in these matters, and have done something to reduce the cost of producing a pig ready for the market.

The next consideration is that pigs should be of uniformly good type. I think you will admit that, from the packer's side, it is to his interest that every pig should be of the type suitable for bacon, as he wants to get an article, which, when it reaches the foreign market, shall be always of the same size and shape. The retailer does not want a box of sides weighing 50 lbs. to-day, and another box to-morrow weighing 60 or 65 lbs., and the next day to get a box weighing 35 or 40 lbs. He wants them all to be nearly of the same size. It goes without saying that it is to the interest of the packers that every pig produced should be of a certain size and thickness. Is it also to the interest of the producer, that pigs be of this character? I think it is. If the packer can command a better price for the uniform article he will be able to pay a higher price to the producer. Therefore, granted that animals, whether of good type or bad type, could be produced at the same cost, I think it is undoubtedly to the material advantage of the producer and packer that every pig produced in Canada should be of a uniform type.

Another question is uniformity of quality. By quality I mean firmness, and thickness, rather than thinness. The producer controls to a certain extent the quality of the bacon he is producing. That has been proven over and over again. That he has absolute control is not so certain, and I think it is undoubtedly to the interests of both producer and packer that every effort should be made to determine what influences affect the quality. At Ottawa we have carried on experiments to determine what things affect the quality. It was for a time supposed that climatic changes had some effect. That idea has been abandoned, and we are almost of the opinion that illy fed swine are the ones that produce soft pork. In my experience poor feeding is the most frequent cause of poor quality of bacon. It is to the interest of every producer to determine the cause, and, if possible, eliminate the conditions or influences effecting differences in quality. We must have pork of uniform quality if we are to command higher prices in the Old Country.

I must say that I think packers do their best to send a good article to the Old Country, if we judge by the bacon they give us to consume here. I find the greatest trouble in securing a prime article of bacon on the Ottawa market, and I concluded from that the packers are doing the best they can to send good bacon, because we do not see any of it at home. We want a uniformly good article for ourselves as well as for the foreign consumers.

We cannot make every pig of uniformly good type, but the producer can improve things very materially.

Another vexed question is the production of bacon pigs in fairly uniform quantities the year round. The trouble in this part of the country is that the average farmers have all the litters come in the spring, and feed them through the summer and have them ready for the block in November, December, and January. If we are going to have a uniformly plentiful supply for the foreign market, according to demand, we must remember that the consumer in the foreign market is going to eat bacon just as readily in July, March or September, as he does in the winter, and we must contrive in some way to get a uniform supply.

Q.—You say you cannot produce pigs as cheaply in winter as in summer?

A.—The packers are willing to pay a considerably higher price in the spring than they are in the fall, not only on account of the law of supply and demand, but because it is to our interest to supply pigs the year round. If the packer is going to hold his best markets, he must be able to supply his best customers with a good article the year round. If we do not feed swine in winter we will suffer for it by getting lower prices for our swine. Farmers are apt to think it is to the interest of the packer only, that he should have a supply of pigs the year round, but I contend it is to our interest that we furnish them with a supply the year round; and if we take prices as they have ruled for a number of years, we will find that the prices in the spring rule, usually, from ½ to 1c. a pound higher than they do in the fall. By furnishing a regular supply we retain our best customers. I maintain it is to the interest of the packer to pay the highest price possible. Of course, the packer is apt to be short-sighted, and squeeze the innocent farmer every chance he gets, but I think by doing so he is making a great mistake, because each time he gives a squeeze, there is a squeal, pork production is diminished, and our market suffers. We cannot by law compel packers to give us any higher prices than they will; that is a problem that may not be settled by discussion.

The most vexed question of the whole thing is that packers pay the same price for the thick fat pork or the thin unfinished pig as they do for the No. 1 selected. It is undoubtedly to our interest that they should not, because, I think we all agree that it is somewhat more difficult to always produce the uniformly good bacon pig.

You cannot get a litter in which there will not be some individuals more easily fed than others, and where you have one-half a dozen litters altogether, there is bound to be a quite considerable percentage ready for the block before the rest.

Now, the average farmer does not want to be bothered making two trips to the market, and he takes them all along, and says he will make that fellow give him the top price for the bunch, and the consequence is that your neighbor who has been most careful, taking only prime pigs, does not get a cent more a pound than did you who took all sorts.

I think it is to our interest as farmers to quit that. I am confident it is also to the interest of the packer to pay according to type and quality. He is always ready with some plausible excuse about that wicked buyer in the country, he is always willing to say he buys according to quality, and pays according to quality, when they reach the packing house, but well we know he does not do so. I think we ought to find some way in which we could compel him to pay according to quality.

At certain points in Canada, there are referees, who have to pass on any dispute that may arise as to the grading of cheese, and I see no reason why it should not be possible to have some men at different points, to classify pigs, and say, "These pigs are No. 1 or No. 2, and must be paid for as such, the price to be fixed by the packer accordingly.

I would like to hear this matter discussed, because I think some solution of this problem absolutely necessary if the producer is to be satisfied, and if the industry is going to progress the way it should in the near future.

There is only one other point. Our bacon has advanced in quality and favor in the foreign market. In reading the paper the other day, I saw where English Wiltshire sides had been compelled to take second place to Canadian bacon. It sold for 74s., and the English Wiltshire at pretty nearly 72s.

I believe we have in this country ideal conditions for the production of bacon. Our packers and our farmers are learning how to produce bacon of superior quality, and the day is not far distant when our bacon will stand at the top. To-day large quantities of our bacon sells on the British market as Danish bacon, and commands the same price; but just as soon as we can get above a certain price, then they call it Danish bacon and not Canadian. We want to find some way to compel merchants to sell our goods according to name and not try to give another country the credit.

It is not for the sake of the other country that they do it, it is merely a commercial swindle, and we want to get over it in some way if possible. It is a practice which is doing no small amount of damage to us. We are coming nearer and nearer the top notch as producers.

From observation and from some little experiments I am of the opinion that, generally speaking, the packer is very anxious for a wide margin, and I am of the opinion that, generally speaking, he gets a wider margin than is quite necessary. I think the packer is making a mistake when he tries to get too wide a margin. He says "I must have insurance; there comes a time when I sell at a loss." I have long been in correspondence with and known packers, and I never remember hearing of their making money. I do not believe, therefore, that they were always telling the truth when they said they were losing, and I have good grounds for the belief that they are making too wide a margin in many cases, and I am confident it is to their interest to not mention the margin although they try to appear open and above board.

Bacon production is almost at a standstill in Canada, and we are not increasing the way we should. Why is this? I think the narrowing of the margin would help to increase the product considerably. If we could get the packer to believe that, I think there would be one part of the solution right to hand.

Q.—Would state owned and controlled packing houses be of advantage to the farmer in securing for him a better price, and also putting a more uniform article on the market?

A.—That is a very vexed question, and one that leaves a great deal of room for discussion.

Q.—I will cut off the last part. Would state owned and controlled packing houses be a benefit to the farmer?

A.—We could hope to get nearer the actual worth of the product, but it would be a certain disadvantage, because it would compel the state to pay a higher price, and you might have to make up the difference by taxation.

Q.—The man who would venture to answer that question would be a pretty bold man. If you are going to establish aid, and state control for the bacon business where would you stop?

A.—I do not say state aid.

A.—When you control, you practically aid.

Q.—Are matters any better to-day than they were before we had discussions on this subject last year? Are we any better off than we were before?

A.—I do not think there was ever any year in the memory of any of the men here that the price of pork has been higher than it has been for the past year, and I think these developments and the increased price is partially due to the discussions and investigations that have been carried on at this Fat Stock Show. During the past summer the price ran up as high as 8 cents per pound, and over that at one time, and during the fall it has never been below 5½ cents. At present it is 6 cents a pound.

RESULTS OF PRACTICAL FEED TESTS RELATIVE TO THE COST OF PRODUCING BACON HOGS.

By G. E. Day, Professor of Agriculture, O.A.C., Guelph.

This work supplements our own investigations in connection with the cost of raising hogs for market. The work was made possible by the Wm. Davies Co., Limited, of Toronto, who generously offered to pay for finished hogs 50 cents per cwt. above the market price prevailing at the time they were marketed, to farmers who would render a full report upon the food consumed by the hogs from weaning until marketed, and upon certain other points necessary to an intelligent study of the question. The details of the work were entrusted to our department, and, up to the time of writing, ten reports have been received from farmers who conducted experiments according to directions. The work, so far as we know, is unique, and the results should be of interest and value to those interested in this important industry. It should, perhaps, be explained that the farmers were allowed to feed the pigs in their own way, and the only rules prescribed were those pertaining to the nature of the facts to be reported. Each report bears a declaration, signed by the experimenter, that it is correct.

Cost of Young Pigs: In our own experiments with 12 litters, the average cost per pig, counting everything (except risk) which we thought could be fairly charged against each litter, was $1.27 at weaning time. To be on the safe side, however, we have charged the pigs used in these experiments at $1.50 each, at weaning time. It must be remembered that the prime object of all this work is to increase our knowledge of what it *costs* the farmer to *raise* pigs and finish them for market. In our general average, however, we have also worked out the cost of these hogs on the basis of $2.50 each for pigs at weaning time, for the satisfaction of those who *buy* young pigs for feeding.

VALUATION OF FOODS: For what may be called supplemental foods, we have used the following values: Skim milk and buttermilk, 15c. per cwt. Roots, $2.00 per ton. Green foods, $2.00 per ton. Whey, 4c. per cwt. These values may be open to question, but it is the meal ration which has the greatest influence upon the cost of feeding, and it will be noticed in the table that we have worked out the cost per pound on the basis of four different values for meal, viz., $20.00, $21.00, $22.00 and $23.00 per ton; our desire being to show what might be regarded as the extreme limit of cost. The term meal includes bran, shorts, etc., as well as ground grain. We could not use the values furnished by our experimenters, because it was necessary to have uniformity of values for purposes of comparison. The exception to this rule will be found in the column under the heading "food consumed." Where values for pasture and miscellaneous foods appear in this column, they represent the values attached to these foods by the experimenters, with the exception of lot 8, where we added what we thought a rather excessive charge for pasture, judging by the statement of what the pigs received.

The table which follows looks somewhat formidable, but it is a table of such exceptional interest that we cannot see any way of curtailing it without detracting from its value. Every lot is worthy of study, and a more intelligent understanding of the general averages will be obtained by studying the figures from which they were computed.

Table I.—Details of Co-operative Experiment.

Lot.	No. of Pigs.	How bred.	Cost at weaning time.	Age when sold	Weight when sold.	Food Consumed.	Cost per lb. when Meal is worth per ton—			
							$ 20.00	$ 21.00	$ 22.00	$ 23.00
			$	Days.	lbs.		c.	c.	c.	c.
No. 1...	9	York. boar, Grade Tam and Chester White sow.......	13.50	217	1,800	Barley, 3,552 lbs.: shorts, 905 lbs.; mangels, 740 lbs.; green clover, 2,850 lbs.; milk, 1,620 lbs........	3.56	3.68	3.80	3.93
No. 2...	12	Yorkshire	18.00	224	2,425	Barley, 5.374 lbs.; shorts, 1,169 lbs; mangels, 815 lbs.; green clover, 3,900 lbs.; milk, 2,160 lbs........	2.77	3.90	4.04	4.17
No. 3...	12	Yorkshire	18.00	247	2,360	Meal (barley, shorts, peas, oats), 7,333 lbs.; mangels, 545 lbs.; milk, 2,520 lbs.	4.05	4.21	4.36	4.52
No. 4...	10	Yorkshire	15.00	238	2,050	Meal (barley, peas, oats), 5.171 lbs.; shorts, 1,038 lbs; mangels, 3,200 lbs.: milk 2,050 lbs.	4.05	4.21	4.36	4.52
No. 5...	7	Berk. boar, York. sow..............	10.50	233	1,535	Barley, 1,950 lbs.; wheat, 1,300 lbs.; oats, 800 lbs.: mangels, 6,000 lbs.; milk, 8,800 lbs..................	4.58	4.71	4.84	4.97
No. 6...	10	York. boar, Tam. sow..............	15.00	177	2,060	Meal (barley, oats, wheat, peas), 4,215 lbs.; shorts, 816 lbs.; whey, 15,000 lbs.; miscellaneous foods valued at $5.00	3.70	3.82	3.94	4.07
No. 7...	14	Yorkshire	21.00	213	2,740	Barley, 1,243 lbs.; shorts, 4,600 lbs.; corn, 1.585 lbs.; milk, 9,330 lbs.; small potatoes (3 bags) and pasture, valued at $5.90............	4.20	4.33	4.47	4.61
No. 8...	7	Yorkshire grade...	10.50	194	1,300	Meal (barley and oats) 2,230 lbs.; shorts, 274 lbs; milk, 3,960 lbs; pasture and green feed valued at $5.00	3.57	3.67	3.79	3.86
No. 9...	14	Berk. boar, grade York. sow	21.00	179	2,740	Meal (barley and peas) 10,016 lbs.; mangels, 3,300 lbs.; milk, 4,020 lbs..........................	4.76	4.94	5.12	6.31
No. 10..	8	Tam. boar, grade York. & Tam. sow	12.00	200	1,740	Barley. 3,115 lbs.: shorts, 390 lbs.; mangels, 600 lbs.; milk, 1,200 lbs: 51 days on stubble, without other food......................	2.84	2.94	3.04	3.14

COMMENTS.

1. A peculiar feature of the experiment is the predominance of Yorkshire blood in the pigs used. This probably has no significance, but it may call for the explanation that no stipulation was made in the conditions of the experiment, regarding the breeds to be used. Any breed, grade, or cross was eligible.

2. There is a remarkable coincidence in lots 3 and 4. The cost per pound of these two lots is practically the same, yet one lot was fed in Ontario county, and the other in Bruce.

3. Another coincidence occurs in lots 7 and 9, both as regards number of pigs and market weight, yet one of these lots came from Ontario county, and the other from Waterloo, points widely distant.

4. As previously explained, the pigs are valued at $1.50 each at weaning time, which is considerably above the actual cost shown by our experiments.

5. Lot 7 was made up of two litters, born the same day, but marketed about a month apart. The 213 days represent the average age of these pigs when marketed.

6. It will be noted that each lot was well up to, and that some of them were above market requirements as to weight. The weights were taken from duplicate weigh tickets, issued by the weighmaster where the pigs were marketed.

7. The cost of gain is more uniform than one might expect from hogs fed under such widely different conditions. Lots 9 and 10 are the two extremes, and call for special notice.

8. It is hard to understand the high cost per pound in the case of lot 9. Looking at the ration which was used, we must say that barley and peas do not look like a good meal ration for very young pigs. On the other hand, it must be admitted that the pigs made remarkably good gains, as they were scarcely 6 months old when marketed, and averaged 195 pounds. It is possible, however, that, though the pigs were not injured, they did not make the best use of the meal, and that there was waste from this cause. If it does nothing else, this group illustrates the point that rapid gains are not necessarily cheap gains.

9. In the case of lot 10, the owner had a field of mixed oats and barley which was very badly lodged. Consequently, there was a great deal of grain left on the ground after harvest. The pigs were turned on the stubble August 1st, and stayed there until September 20th, receiving no food but what they gathered for themselves during that time. As it is manifestly impossible to place a value up on such food, this group is not included in the general average, but it is inserted in the table as an example of how farm animals can frequently make profitable use of what would otherwise be wasted.

Table II., which follows, shows some general averages.

Table II.—Averages.

	When meal is worth per ton :—			
	$20.00	$21.00	$22.00	$23.00
Average cost per pound of 95 pigs omitting lot 10. when pigs cost $1.50 each at weaning time	4.07c.	4.21c.	4.35c.	4.49c.
Average cost per pound of 95 pigs, omitting lot 10, when pigs cost $2.50 each at weaning time	4.57c.	4.71c.	4.85c.	4.99c.

Average age at which pigs were weaned, 52 days.
Average age at which pigs were marketed, 214 days.
Average live weight of pigs when marketed, 200 lbs.

Comments.

1. In both tables there is much of encouragement to swine breeders and feeders. The general average shows results from 95 hogs fed upon eight different farms, and reflects great credit upon the skill of the feeders.

2. That the average cost per pound should be within 5c. when meal is valued at $23.00 per ton, and the pigs at $2.50 each when weaned, is much beyond our expectations.

3. We regard $20.00 per ton a fair valuation of meal when the grain is home grown, as it includes much that is not marketable. Even when much of the feed has to be bought, we believe that, with a little foresight, the meal bill can be kept well under $22.00 per ton. If the farmer buys injudiciously, or uses unnecessarily high-priced foods, he should not blame the pigs.

4. These experiments show cheaper average gains than were obtained in our own work, but most of these experiments represent summer feeding, whereas, most of our feeding was done during the winter.

5. The experimenters who conducted this work, are Messrs. W. J. Cunningham, Nicolston; J. A. McKenzie, Columbus; Robt. Bray, Walkerton; James Scott, Galt; I. T. Gleason, Lakeside; W. G. Smale, Woodville; W. A. Rowand, Walkerton; Geo. Johnson, Cannington.

Q.—Do you know the price received for any of these lots of hogs?

A.—The price varied, more or less, as they were sold at different times during the summer and as late as November. The price would range from 6 to 7 cents per pound.

Q.—Have you figures showing the net profit on each hog?

A.—No, because these hogs were sold at different prices. The main object of this work was to gain information regarding the cost of production.

Q.—Was any allowance made for labor?

A.—As previously stated, no allowance was made for labor and no credit was given for manure.

Q.—What do you consider the best grain food for young pigs after weaning them?

A.—You will notice from the chart that a great variety of foods has been used in these experiments. Personally, I prefer to use wheat middlings for young pigs at this time. A few finely ground oats mixed with the middlings will sometimes make an improvement. After the pigs are between three and four months old, a little barley may be introduced and gradually increased as the pigs become accustomed to it. At this time, also, other grains may be added to the mixture. In fact, the greater the mixture of grains, as a rule, the better.

Q.—Is not milk worth more than 15 cents per hundred?

A.—Sometimes it may be worth a great deal more, especially when used in limited quantities for giving young pigs a start. Where it is used in large quantities, however, and especially where it has to be drawn every day from a creamery, I think that 15 cents per hundred is a very fair valuation.

Q.—Do you think hogs can be grown properly without milk or whey?

A.—It is certainly more difficult to raise pigs without either of these dairy by-products. The only substance that we have used that appeared to give very good satisfaction as a substitute for skim-milk is a product called tankage. Unfortunately, however, this product is scarcely available to the Canadian farmer, as it is manufactured in the United States. Pigs can be raised, however, without skim-milk or whey, but the farmer who has neither will always be handicapped.

Q.—Was there any difference in the quality of the different lots of hogs when marketed?

A.—They all turned out firm, practically no soft sides.

Q.—Would it not be a more intelligent chart if the pigs were fed altogether on bought food?

A.—The man who has to buy all his feed is not in a position to feed animals of any kind to advantage when competing with the farmer who raises his own feed. He can raise it on his own farm a great deal more cheaply than he can buy it, and if he had to buy he would be in about the same position as a manufacturer who had to pay the highest retail price for all the products he used. Such a manufacturer could not hope to compete with one who obtained a liberal discount on his raw material through purchasing it in larger quantities, or through having control of natural resources which allowed him to obtain his raw material at low cost.

Mr. Hutton: I think the meeting owes a great deal to Prof. Day for presenting this chart. All of us who have been feeding pigs know that we cannot get the same results from different lots. Individuality has to be taken into consideration, and this chart shows to us what variations we may expect from different litters of pigs. From my own experience, I know that pigs can be fed at a cost of about 4 cents per pound, and if we can produce them at 4 cents and sell at 7 cents, we need not bother about how rich the packers are getting. We are going to be able to pay off our mortgages and put money in the bank.

A Member: Some persons here have stated that milk is worth 30 cents per hundred. This may be true for certain conditions, but there are many farmers who live a long distance from the town and cannot sell their skim-milk, and if they cannot sell it, what better use can they make of it than employ it for feeding pigs. It is a splendid food for young pigs, and that is the best use to make of it.

A Member: I think a man realizes 40 cents a hundred when he feeds it to pigs.

Mr. GRISDALE: We carried on a number of experiments at Ottawa to determine the value of skim-milk for feeding swine. We fed it in large and small quantities with different kinds of meal to swine of different ages. When we fed from 6 to 10 pounds a day per pig, we found that the skim-milk was worth on an average about 15 cents a hundred. We got as high as 42½ cents per hundred where it was fed under exceptionally favorable conditions, that is, where it was fed to young pigs in small quantities and at the right time.

The CHAIRMAN: As I understand the discussion here, it has been asked, what does it cost per pound to produce pork? Last year Prof. Day gave us some figures of his own, and now he furnishes figures from ten or twelve farmers, and some of you are not yet satisfied. I suppose one might have a hundred other farmers repeat this experiment and they would get figures slightly varying from the ones we now have. If you are not willing to accept these figures, I would urge you to keep track of your own feeding operations and bring the results with you next year, as the more information we can obtain on this point, the better.

FARM LABOR PROBLEM.

BY J. M. MCGILLIVRAY, STAFF CAPTAIN, SALVATION ARMY, LONDON.

We are continually confronted with the difficulties that present themselves in this matter of farm labor. I should like to speak of two or three of these difficulties. One of the greatest is to educate the farmers to the absolute necessity of making arrangements, not only to secure help, but to keep them the year round. To quote an instance. I went to a place called Watford, in the county of Lambton. A farmer had one of our young men. I enquired as to how he liked him and how he was getting along with his work, and received the reply that he did not know anything when he came to him, but was learning and giving satisfaction. I then asked him how long he would keep him, and received the reply, "Not more than seven months in the year." I remarked to him that he had a very nice farm. He told me that for the want of help he had to go out of raising much of a crop, and was just putting in a few fields of oats. His farm was worth $6,000, Now, you can draw your own conclusions from this, and plainly see the wisdom of keeping help when once procured.

We find the man who makes the greatest success of his farm is the man who employs his labor all the year round. Where the farmer employs a married man and gives him a house on the farm, we find in almost all cases this kind of help gives excellent satisfaction.

In the fruit-growing districts the people show they are able to do something and are putting up temporary houses where they will be able to take in families, and their children who also are able to work.

Another difficulty we find is to get farmers who are willing to pay sufficient wages. I think the Government has been wise in putting a scale of from $10 to $12 per month for the first year.

One man came to me and said, "I would like a young man eighteen or twenty." I asked him to fill out his application, and state what wages he would pay and received the startling reply he would like to start him on $6 per month. I told him he could not get a boy to drive cows for that. He said he thought possibly the man he would get would be no good. I said he would not be any good if he was not worth more than $6 per month, and then asked him how long he thought he would stay for that wage if he were any good at all. He might muster up courage to pull through the first month, but would hear of other men getting more and would certainly leave the first chance.

If a man shows any sense of willingness to work, learn and get on, providing he is paid reasonable wages, we find the results have been very satisfactory and very seldom have found cause for serious complaint. We have found on the whole that people have been agreeably surprised by the willingness and readiness with which the laborers have taken hold of the work.

We have in operation an excellent system of selection. Other agencies have suffered because of the want of this system. The London *Daily Telegraph*, about two years ago subscribed a sufficient sum to send out a number of families to this country. A certain number of them were put under our jurisdiction, and a certain sum of money put in our hands for us to see that they did not come to serious want. During six months I was called upon to visit two of these families, in each case twice, and during the same period of time I was not called upon to investigate any of our own families at all.

We started about two years ago with only a few officers engaged in this particular branch of our work, and at that time handled one thousand people. We have no apologies to offer for our existence, for the Salvation Army scheme is only one of the outcomes outlined in that book published by our beloved General, entitled "Darkest England and the Way Out."

Canada offers unbounded opportunities for those coming from the Old Land to make new homes for themselves in this country with its boundless resources. The Government, the steamship companies and railway companies have helped us. The second year we took out about 4,000 people, so that the first two years we took out 5,000 people. This year we started to take out 10,000, but have practically taken out 13,000.

DIFFICULTIES MET AND OVERCOME. You will readily see that there have been many difficulties in our way. We have practically overcome them all. Two years ago we approached one of the largest steamship companies in the world and asked them to give us free passage to a conductor passing outward on their line. We pointed out that there was future business for them. They said, "Perhaps there may be, but we are not prepared to grant your request." We stated, "The day will come when you will want our business." In reply they said, "Perhaps that is so, but we will wait and see." Last summer when I was in England, our representative who does business with the steamship companies said that one of those officials said to him, "Why don't you give us more of your business?" and received the reply that we were prepared to give business to the people who met us. They said, "We are prepared to do anything for you." The representative then reminded him of the fact that the privilege of sending a conductor with the party to Canada had been denied. They saw their mistake, and were then most anxious to meet us with every possible facility to carry on our work.

Last year we chartered outright three ships, and this year had to increase the number to five. This season, at the present time, we have practically secured all space available on ships sailing from the Old Country to this, and have chartered six ships, and expect to bring out from 25,000 to 30,000.

Some people run away with the idea that there will be so many coming that they will be sure to get a man. But, when you remember that the

Grand Trunk Pacific have let contracts for three sections of their road, and have advertised for 10,000 men, we find that the demand is greater than the supply. Other countries are saying, what is good for Canada is good for us, and are offering inducements to get people to come to their part of the world.

Last season we had over 100,000 applications from people on the other side who wanted to cross over and come to Canada. Out of that number we made a careful selection of 13,000.

To my knowledge, in Western Ontario, we have had to deport only one family, and that was the case of a woman who came to this country with a good medical certificate. She took ill, and it was found that she was suffering with tuberculosis. She, with her children, were sent back by the Salvation Army.

When we charter our own ships we are able to keep temptation away from the passengers. We like to impress upon the passengers that this is the opportunity to lead a better life. When the ships sail the bar on board is closed tight. We use half of the smoking room, which is fitted up as a labor bureau. The men are put in situations while on board ship. Then we pass them on to our booking office. Their money is changed, their ticket bought on board, and they are sent direct to their destination. We also give a lecture on board, one to the saloon passengers, and one to the steerage passengers, giving them particulars of this country, and all information which will be helpful to them, also allowing them to ask questions which are answered by the officer who delivers the lecture.

Fifty per cent. of the people we bring from the Old Country come into Ontario. When I say Ontario I mean down as far as Kingston and Port Hope. But the greater bulk come this side of Toronto. And yet, we find the cry as great as ever that the people want help, and we have not been able to do anything towards supplying the demand.

I would strongly advise the farmer never to apply for thoroughly experienced men because there are very few who come. If they had a certain knowledge of farming in the Old Country they have to learn over again here. Some of these fellows have been in the militia, and can ride a horse, but you do not want them for that; you want them to drive a horse. It is not so much what the man knows as what he is willing to know. Men between twenty and thirty are good; over that age they are not so apt to pick up Canadian methods.

The Ontario Government has purchased property in Toronto and handed the same over to us to manage. That building is to be used as a Receiving Home. We receive all the Government immigrants, and our own as well. That keeps the people away from temptation. Very often they are sent to hotels; and we have had some difficulty along that line. In a short time that Home will be opened and ready to receive the first contingent. We also have a Home in Toronto where young women are received and sheltered and cared for.

The question may be asked: "What are we doing about domestic help?" It is said that the Salvation Army is bringing out people from the submerged class, but I would like to announce here that that is not correct. These girls who have been helped to a pure life are far better in their own country under the care of somebody who will take an interest in them, take them into their home, and assist them on in the world. We guarantee the average girl that comes to this country not less than $10 per month. Therefore, you can see the girl would have to be of some little consequence before she could take that wage. We have, in Toronto, many girls receiving $12,

$15, and some as high as $20 and twenty-two dollars per month, who are cooks. When we bring out forty or fifty they are gone in two hours' time after they arrive in Toronto.

We do not guarantee to secure a domestic for any person. But in some cases where a lady has advanced two-thirds of the passage—about $23—and has ordered a girl two or three months ahead, when the girl is placed with her she has two weeks' trial, and if satisfactory, she keeps the girl, who pays her mistress back at the rate of half her month's wages. But, in case the girl is unsatisfactory she is taken away and a satisfactory one found, or the money refunded, with the exception of $2.50 fee.

If you went to England you would hear nothing about British Columbia and the Northwest. But, it would be Toronto and Ontario. When you speak of Prince Edward Island, New Brunswick, and Nova Scotia, they do not know what you are talking about. Coming up the St. Lawrence we have some difficulty in making them think one side is not America and the other Canada. One man got off at Quebec and said to the man on the wharf, "Will you please tell me which door to take to get into Canada?" For fun the man said: "Take the first door and turn to your left and you are there." (Laughter.)

This year we hope to get hundreds of Scotland's sturdy sons. We find they are in great demand. The Dane, Swede, and Norwegian, also make excellent people for labor and other work. We are prepared to do everything in our power to co-operate with the Government in bringing out to this country laborers, and placing them in satisfactory situations.

Q.—What guarantee do you give your people that they will get their pay from the employers?

A.—We have found that there are a few farmers—but very few—who have played sharp tricks on some of the people. But I am pleased to say—and I think it is to the credit and honor of the people of this country—that these are rare exceptions. We find that the farmer is prepared to pay a man who works for him.

Mr. Armstrong: As an Ontario farmer, I wish to thank the Salvation Army for the help they have given us this summer. I employ three men, and give them $20 and $22 per month, board and washing included. One Highland man in particular got so familiar with the work that in one day he could plow, and it did not take him more than another day to learn to milk. They soon get adapted to our work.

CAN THE RECEIPTS FROM THE PRODUCTS OF THE AVERAGE DAIRY COW BE PROFITABLY INCREASED BY MORE GENEROUS FEEDING?

By J. H. Grisdale, Agriculturist, Central Experimental Farm, Ottawa.

To the question, "Can the receipts from the product of the average dairy cow be profitably increased by more generous feeding?" I would reply, I believe they can. I believe that if the average Canadian farmer would increase the amount of food the yield from his dairy cattle would be profitably increased Now there are various modifications of that statement necessary, but I want in the first place, to prove that it can be done. I prove this primarily from the returns that we have received from herds all over Canada. As Mr. Whitley said this afternoon, the Experimental Farm has been furnishing blank forms to farmers to keep records of the milk product of each cow, a great many of the farmers are quite willing to take the time to send in the return, and from these returns I cannot help concluding that the average cow is not sufficiently well fed. We have returns from herds that show as high as 5,000, 6,000 and even 8,000 pounds of milk per annum, and we have returns from other herds showing anywhere from 2,000 to 2,300 pounds per cow per annum. Invariably where the return is striking, I write the man who sends in the return and make enquiry about his method of feeding and other incidentals, and in almost every case they have given us the required information, and where good returns have been received we find that the man is a generous feeder, and just as invariably where very bad returns have been received, we find that the man does not feed at all, practically just keeps his cows alive. To prove this, let me cite the case of Eastern Ontario and in Quebec in general, during the past season. I have visited very many cheese factories in Quebec during the past season and have had conversations with many farmers. In the early part of the season the returns were exceedingly satisfactory; in the month of June, wherever I went in Quebec, there was a feeling of jubilation and high expectation on account of the great amount of milk available and the returns their cows were giving. In September I started out through that same district and the tune was changed. In some cases farmers were not producing enough milk to keep the factories going. Some cheese factories in the neighbourhood of Ottawa were compelled to close down on account of the scarcity of milk; in other years they had been producing sufficient milk to enable the factories to run, but this year on account of the scarcity of grass the factories had to close down. Conclusions: Lack of feed disastrous to profits.

Probably some of you know of an experiment conducted on the other side of the line which was one of the most convincing proofs of the correctness of the statement that it pays to feed cows well. The Professor of Animal Husbandry, at Cornell University, decided some years ago to carry on an experiment to determine, if it were possible, to influence the percentage of fat in the milk yield in a herd; the results I want to give you have nothing to do with the percentage of fat, I mention it to show that it came in without any particular effort being made to demonstrate this point, he went after one thing and found another. He made a journey through various districts near the University and visited the farmers. At last he came across a herd of about 30 cattle, the owner of this herd was shipping the milk product to a neighbouring city and he claimed to have an average herd. After an examination of the cattle the professor asked if he might be allowed to send a man to stay with this farmer during one year. Permission was granted, and during that year a record was kept of the milk from each cow, of both quantity and quality, and at the same time a record was kept of the fat. Valued at current prices it was found at the end of the year the herd had consumed about $28 of food. They had produced $24.50 worth of milk, showing a net loss of $3.50. At the end of the year this was shown up, and the farmer was invited to sell his herd. When he saw the returns he was pretty near willing to sell, and the herd was purchased and taken to the College barns, and for one year after the herd was generously fed, though not in my opinion wisely fed, and at the end of that year they had given $38 worth of milk, while the cost of feed instead of being $28 per head was $33, a difference of $5 in favor of the cows at the end of the year. Now the increase of $5 in the amount of food made an increase of about $13.50 in favor of the cow. That is the most conclusive proof I have ever seen in favor of generous feeding, and is the best proof of the absolute necessity of feeding our dairy cows generously. We must use discretion and judgment, and we must get science to help us to feed well. Let me give you an experience that I had some few years ago. I took over a herd of some twenty-five head of cattle, and for one year fed them as they had been fed up to that time, a very generous ration, giving them all they would consume. At the end of that year we found these cattle had produced 5,400 pounds per head—not a very large return. Next year we got rid of two of the worst of the animals, and started in to feed, not a more generous ration, but a more suitable ration for each animal. We fed them not only according to specified rules and requirements, but also according to the taste and liking of the individuals and the result was truly astounding. At the end of the year we had returns from our cows of 6,500 pounds. One thousand one hundred pounds in favor of the cows, at the end of that second year, and what was stronger still, instead of the feed having increased in cost we had managed to decrease it, instead of costing us $39 or $40, it only cost between $37 and $38, a decrease of about $2 a head, and that is possible if you are willing to study the best methods of feeding cows. We did it by watching most carefully the increasing or diminishing returns from every animal. It is possible to feed a cow so long with one ration that you do not notice whether she is going up or down, she is not being stoked as it were to the highest pressure she will stand. You can give one cow 15 or 20 pounds of meal a day, but it is merely throwing the meal away; that cow would give much better returns from 7 or 8 or 9 pounds of meal. Some cows will do better with a little oats or perhaps a little shorts or barley. A cow is more fickle in her appetite than even the average man, and the ladies know how hard he is to feed. Of course in summer we have grass for our cattle, and this is the point to which the greatest attention should be paid. Throughout Eastern Ontario and Quebec, where the greatest dairy interests are centred, we have been urging strongly the importance of sowing green crops to be harvested and fed when grass is short. The average cow does not get enough pasture. If you vary that pasture by some other food, she will do better. I have seen cows come off first class clover pasture and eat 10, 12 or 15 pounds of ensilage. Clover is exceedingly rich in the principal constituents that go to make up a good milk ration, and if we add a little bit of ensilage or green oats or any other green feed, the cow will consume more, and I am confident that the increased food consumed will very much more than pay for itself in the way of milk. The cow's appetite is the measure of the return provided that with which the appetite is appeased is of such a character as will promote the economical production of milk particularly in summer when almost every cow is at the highest state of her productiveness. We advise feeding a small amount of meal in the summer, but there is no doubt green food is the important thing. Even foods which we consider not particularly well suited for milk production, fed along with a bit of grass have a wonderful effect upon the milk flow; green corn or sorghum or green oats, added to the grass ration, will very materially increase the milk. Vetches, peas, tares, clover and alfalfa—the more of these you can persuade your cows to eat the better chance you have of success in dairying operations. I think I have shown what I started out to prove, and if there are any questions, I shall be only too glad to answer them.

Q.—Does ensilage injure the teeth of the cattle after they have been fed on it for some years?

A.—We have cows twelve years old that have been eating ensilage all their lives and they have their teeth yet. We have individuals from thirteen to fourteen years of age down to calves, and I know of no cases where the teeth have been injured by eating ensilage. There is no doubt that soiling is by far the most profitable system of milk production, but it requires considerable labor, and probably that is one way in which you can make the very best use of many of those gentlemen of whom Capt. McGillivray has been speaking to-night. You should sow a little rye some time in September or a little earlier, and it will come in and be ready for feeding in May. Probably the best plan which any farmer who is interested in milk production can follow is to set aside near his barn an area of 1-15th of his arable land, divide it into three parts and follow therein a regular rotation. Supposing he has 100 acres, let him set aside eight or ten acres, and upon one field of three acres sow rye, which can be harvested, and then follow it by corn, and upon the field next to it he could have peas and oats and vetches sown at the rate of about 3½ bushels per acre, and if he mixed with it about 10 lbs. of clover per acre he will have a good catch of clover. First, he will have the rye, then the first cut of clover, and that will be followed by peas and oats and vetches which should be sown in three equal parts, one as early as possible, and the next a couple of weeks later, and the next acre a couple of weeks later still, and after that is through the second crop of clover will be ready, and if not, the corn will be ready to cut, and he could start in upon that. This will be found quite sufficient to supplement the pasture for the stock that would be carried upon a hundred acre farm. Pasture is by all odds the most expensive way of feeding cattle we know of in Ontario, and it is the surest way of getting particularly low returns from the land. We have conducted at Ottawa a number of experiments on this line, and from a given area in pasture our returns have only been about $20 per acre, whereas on land that was cultivated the income has been about $35, or almost double. The only redeeming feature of pasture is the minimum quantity of labor required.

Q.—Do you improve the quality of milk by feeding the cow?

A.—What do you mean by "improve"?

Q.—Increase the per cent. of butter?

A.—No, it cannot be done.

Q.—Would you recommend feeding alfalfa?

A.—Yes, if a man has a hillside or a field that he can conveniently leave down for a number of years, he might profitably set aside a couple of acres for alfalfa. If he has a field where the water cannot lie at any season of the year for over 24 hours, and if it is in fairly good tilth he may hope to succeed with alfalfa. Alfalfa is quite as hardy as red clover provided the land is thoroughly drained in summer and winter.

Q.—Would you recommend feeding sugar beets?

A.—Sugar beets are a most excellent food for milk cows. You cannot grow quite the same weight of sugar beets as you can of mangels or sugar mangels. Under average conditions sugar beets generally fall from 5 to 8 tons below mangels.

Q.—You do not mean the commercial sugar beet, but what they call The Royal Giant Sugar Beet?

A.—That is what I mean.

Q.—Is bran at $20.00 a ton profitable for feeding cows?

A.—With milk at the present prices, bran at $20.00 a ton may be profitably fed to dairy cows. Of course you will have to consider what the other parts of the ration are going to be.

Q.—Would it be profitable to sell wheat at 70c. a bushel and buy bran at $20.00 a ton?

A.—Yes, wheat is not particularly well suited for milk production; bran is very much better.

Q.—Would it pay to sell peas at 70c. a bushel?

A.—No, peas at 70c. are much more valuable than bran at $20.00 a ton.

Q.—What about flax seed meal?

A.—That is much too expensive to feed to dairy cows. It is exceedingly rich in fat, and we want something rich in flesh forming constituents. Ground oil cake is one of the best feeds you can get. It is superior to peas. Flax seed meal is very expensive, and is not as good as peas for milk production; a little bit of it is all right, it has some medicinal qualities.

Q.—What experience have you had with the common white field bean?

A.—I have had no experience, but I would say it would have very great value. I have seen beans fed in the old country where they are looked upon with much favor.

Q.—Do you ever feed gluten meal?

A.—Yes; in large quantities, and have been pleased with it, but I do not consider it quite as satisfactory as oil meal. We are carrying on an experiment now comparing groups of cows fed on gluten, oil meal and cotton seed meal, and upon bran and oats, and I hope another year to be able to give you something interesting on that line.

Q.—Would it be good to mix with oat chop and barley?

A.—It would; gluten is a very indefinite term, at the present time. Is it gluten feed or gluten meal?

Q.—Gluten meal?

A.—Is that the name on the bag?

Q.—I could not say as to that. There is a little circular in the mouth of every sack. A neighbor of mine sent and got a car load, and quite a number of us joined in with him and took this carload.

A.—Is it like corn meal, heavy granular stuff? If it is gluten meal it has a very high feeding value nearly equal to ground oil cake.

Q.—Is that for feeding dairy cows or beef production?

A.—Either, sir, we have fed it to beef and to dairy cows with very satisfactory results in both cases.

Q.—Would you supplement pea meal with gluten?

A.— No. Pea meal might take the place of gluten, but I do not know that it is any better. Pea meal has almost gone out of use with us in the east, because peas are simply out of sight. We cannot buy them all at short of about $1 a bushel, and there is no use trying to feed them at that price.

Q.—Cannot they be successfully grown with oats?

A.—Grown and ground with oats they do very well indeed.

Q.—Would you advise feeding that gluten meal and pea meal with oat chop?

A.—No, I would not advise feeding gluten meal and pea meal at the same time, feed one or the other. Of course you might feed a small amount of each, it would vary the ration, and the cow likes variety. You might give a cow 5 or 6 lbs. of meal, and it would hardly eat it up in a day; but if you gave her 6 or 8 lbs. of pea meal and bran and oats and shorts she would eat twice as much.

Q.—When is the best time to have a cow calve in order to get the most milk?

A.—You would get the most milk from the cow by having her calve in one of the autumn months. A certain cow in our herd calved in November, and during December, January and March, she has given about 1,000 lbs. of milk a month. In April and May, she dropped to 900 and 800 respectively. In June when she went on to fresh grass she went up to 1,000; in July she began to fall again, and that shows the effect of grass upon the milk production, and for that reason I think the very best thing you can do is to have them calve in the fall.

Q.—How much ensilage do you recommend to feed per day?

A.—I would recommend to give all you can, all the cow will eat up clean, and give her the amount of meal you feel she ought to have. If a cow gives 30 lbs. milk, give her 6 or 7 lbs. of meal, and all the ensilage she will eat, probably 45 lbs. There is no danger of overdoing it if you give the right amount of meal and a little hay.

Q.—Some years ago, we were sending milk to the cheese factory, and some of the farmers were feeding the cows on green rye, and they sent the milk back, as they claimed it colored it and made it smell.

A.—Green rye if fed in very large quantities will do that just the same as rape and turnips. The only excuse for feeding rye is that it is the earliest food you can get in the spring, and it will have an effect on the quantity of the milk.

Q.—You get the customers used to it, and they do not notice it.

A.—That is the very idea.

THE PRACTICABILITY OF THE MILKING MACHINE.

By H. H. Dean, Professor of Dairy Husbandry, O.A.C., Guelph.

To show you the interest that has been taken in this question it is said that over 130 patents have been taken out in the United States since 1872.

Before we can understand this question we must know something about the physiological processes that go on in the secretion of milk. The secretion of milk is a mystery so far as we know. We believe the milk is partly made by the breaking up of the cells, which make up the cow's udder, and partly by filtration from the blood. Some scientists say that a ferment in the cow's udder produces milk. It is altogether likely it is the result of the first two processes combined—the breaking up of the cells of the udder, and the filtration from the blood.

So far as I can see there is no reason why cows might not be milked satisfactorily by machinery.

In the mechanical problem three questions have presented themselves. Shall we milk cows by sucking, as the calf does, or shall we do it by pressure, the hand method of milking; or combine these two?

If I were to offer a personal opinion, my judgment would lead me to conclude that the successful milking machine will be one which imitates hand milking. Why do I think so? Because all the best dairy cows that the world has seen produced have been developed by hand milking, and not by calf sucking, and the tendency is that in every case where the calf sucks the cow dries up much quicker than when she is milked by hand; therefore I say I look for the development of the milking machine that imitates the hand milking of the cow.

A milking machine, to be of service, must be simple, cheap, durable, easily cleaned, require a minimum amount of power, time and labor to operate it, and a person must be able to milk from four to six cows at once. These are what I consider essential things in the mechanical milking machine. At the College we have had practical experience with three or four different kinds of milking machines. I have, personally, taken a great interest in this question. Any man who approaches a subject of this kind should approach it free from bias as far as possible. He ought not to have any set opinions. If I have had any bias at all it has been in favor of the milking machine. The first machine which we had any experience with was called the Murchland. We experimented with this machine until we were satisfied it was not a practicable machine for milking cows, and we threw it to one side. I had the pleasure of meeting Mr. Murchland last year at Glasgow at the Highland Show. I had met him twelve or thirteen years ago, and at that time he was very enthusiastic about the machine, but, when I saw him at Glasgow last year, he was not quite so enthusiastic.

The next machine we had a practical experience with was the Thistle. I have here the milk cup of that machine. You will notice that the inside of the cup is like a calf's mouth. There are two lips and a piece like the tongue of the calf, and it is supposed to imitate both hand milking and calf sucking, so that the cow would think she was being milked by hand and sucked by a calf. The difficulty was with the cleaning of that machine, and after spending a good deal of time and money, we laid that to one side.

The next machine we had experience with was a sort of roller, or rather four rolls and a rubber flange, and you set this up under the cow and turned the crank, and these rollers pressed against the cow's teat and squeezed the milk out. That would be all right if all cows' teats were exactly the same size and hung exactly the same length from the cow's udder; but as they do not, the machine was not a success.

The next machine was the B. L. K. Milker, I have one of them here, for milking two cows at once. First the air is exhausted from the pipes above the cows, and then these cups are put on the cow's teats. As soon as the cow's teat is inserted in there, the pressure of the atmosphere, being taken off, the milk at once begins to flow. There is a sight glass which enables you to see the milk as it passes into the machine. On top of the machine there is a regulating valve which gives an alternating pressure. That is, the pressure is not constant as it was in the case of the Murchland. You have a pressure equal to about half the atmosphere coming on the cow's teat, and by means of this valve, a certain amount of air is allowed to come in. The milk comes down into the teat, and from there into the cup, and down into the pail. We have tried to give every consideration to the machine, and I would like to mention, at this time, my personal indebtedness to Mr. Wood, our herdsman, for the large amount of time, and the care and patience he has exercised in the operation of the machine. Personally, I have not had time to look after the machine. Also, I am not mechanically inclined, and I would not go to the bother of fussing with the machine in the way that he has done. We put the machine in our stable at a cost of about $250.00, or at about half the regular price of the machine. The manufactory gave us a cut rate on the machine. We began operating it on the 1st of January, 1906, and we have had 11½ months experience with it. During the month of December, 1905, fifteen cows were milked by hand and in January the same cows were milked with the machine. They gave in January, 1,351 lbs. less milk, when milked with the machine, than they did in the month of December, when milked by hand. They gave 47.22 lbs less milk fat, equal to about 55lbs. of butter or 3½ lbs. less butter per cow during that month, when milked with the machine, than they did in the month of December, when milked by hand. We expected that. After milking them during the month of January with the machine, on the 1st of February we selected four cows to make a special test, and they were milked from the 1st of February to the 14th with the machine, and from the 14th by hand. For the period from February 1st to the 14th, and from March 1st to the 14th, when they were milked by the machine, we found that the average production per cow was 483.7 lbs., and when they were milked by hand, from February 15th to the 28th, and March 15th to the 30th, the average production was 503.5 lbs. per cow. Three out of four cows gave more milk when milked by hand than they did when milked with the machine. In nearly every group we had certain cows that seemed to milk as well with the machine as by hand. The four cows, during the two weeks, gave 79 lbs. more milk, and 6.89 lbs. more fat when milked by hand than they did when milked with the machine.

From March 30th to May 10th three cows were selected and these cows gave 80 lbs. more milk when milked with the machine, than they did in the two weeks, when milked by hand, and we were quite well satisfied, at that time, that the machine was giving us fairly good results, and for a long time we allowed the machine to milk practically all our cows. I was, personally, very much pleased with the results, but about the 1st of July, we found that a number of our cows were dropping rapidly in the milk, and we were obliged to take several cows off the machine and milk them by hand, because they would have dried up altogether. I am not going to make any positive statements, because the man who makes the most positive statements about things is the man who often knows least about them. The man who studies a question of this kind needs to be very careful.

When the cows were on pasture we made a similar experiment, to the experiment made in the winter, and they gave 7½ gallons more milk by hand than they did when milked with the machine. Five cows gave more milk when milked by hand, and two cows gave less milk than they did when milked by the machine. There were four cows that were being milked by hand during all this time. In order to compare the results got from the machine, as to the effect of advancing lactation, these four cows which had been milked all the time by hand gave 154 lbs. more milk during this machine period, showing that, in all probability, the machines were not doing as good work as hand milking in maintaining the flow.

In the middle of October we wrote for an expert to come and tell us if we could get any better results from our machine. We were not satisfied. He recommended manipulating the cow's udders. I am satisfied there is little, or nothing, in the manipulation of the cow's udder, and you will notice that, in the majority of cases, when you begin manipulating that the cows will at once contract the muscles of the abdomen. Some say that the muscles of the abdomen have no connection whatever with the ducts where the milk is secreted. My own impression is that the cow can close these ducts, and she usually does it by contracting the muscles of the abdomen. We made some experiments to see whether we could produce better results by manipulation of the udder, and in order to do that, we milked some of the cows with the machine and manipulation, and some by hand, and we came to the conclusion that there was little or nothing in the manipulation of the udder, except it seemed to prevent getting the strippings after you stopped milking with the machine. On the 1st of November ten cows were again put on an experiment for two weeks. Eight out of the ten gave more milk by hand, and one gave the same amount by hand as with the machine, and one gave less milk when milked by hand. Certain cows in every group seem to give as good results with the machine as by hand.

Summing up the whole question of the experiment in November, we find that the cows gave 384 lbs. less milk with the machine during the same time that they milked by hand. We find that, comparing inexperienced milkers with the machine, there was not very much difference. Our herdsman is an expert milker, and he can always get from two to five pounds more milk out of a cow by hand than with the machine, and usually, from one to three pounds more than an inexperienced milker can get, and this would lead us to believe that it is possible you might get as good results from the machine as you would get from a person inexperienced as a milker.

My conclusions are: 1. In the four comparative tests which we have made, three out of four cows gave more milk when milked by hand than they did with the machine. In one test they gave more with the machine than they did with hand.

2. Inexperienced milkers may get no more milk from the cows, for a short period, than is got with the machine, but a good hand milker will always get more milk than will the machine.

3. Cows tend to dry more quickly when milked with the machine. No. 15, in 1905, milked for 320 days; in 1906, 230 days, or nearly 100 days less when milked with the machine. No. 17 milked 301 days in 1905, and 217 days in 1906. No. 66 milked 287 days in 1905, and 233 days in 1906. We estimated that the cows in our herd gave 10,118 lbs. less milk, when milked by the machine, than by hand, and that amount of milk was worth, at least, $100.00.

We have certain young cows, heifers, that had hardly ever been milked by hand, and they gave us very good results. We have one two year old heifer that has milked this whole year with the machine, that has given us over 8,000 lbs. of milk. This leads us to believe that it is possible that young cows, if they were milked with the machine from the start, might give satisfactory results. Our experience leads us to believe that the most satisfactory results are likely to be got from young cows that have never been milked by hand.

Special care is needed in the cleaning of the machine. We followed the directions of the manufacturer as closely as we could, and I have no hesitation in saying that the directions given by the manufacturer will not clean the machine. They must have more care than is recommended by the manufacturer, to get them ordinarily clean, and to keep them bacteriologically clean. Most of the parts that come in contact with the milk must be boiled once a week, and they ought to be boiled every day.

So far as I can see, at the present time, it will not pay a man having from ten to twenty-five cows to invest $500 in a milking machine. The man who is milking from fifty to seventy-five cows may very well consider the milking machine question, especially if he finds it difficult to get suitable hand labor.

Q.—How was it some cows gave more milk when milked with the machine than by hand?

A.—That is one of these questions that it is impossible to give a satisfactory answer to.

Q.—As probably some of you are aware, in Wisconsin some experiments have been carried on in the manipulation of the udder, and the results they report are diametrically opposed to what Prof. Dean reports. Were the methods of manipulation the same here, and, if so, how does he explain the exact opposite results?

A.—So far as I remember the results got at Wisconsin and Cornell were slightly in favor of manipulation. In talking over this matter with Prof. Woll, he was not enthusiastic about manipulation. So far as I can see, there is nothing in the manipulation of the udder, and any of you who wish to try it at home should note the effect upon the cow, especially with a nervous cow. Just the moment you begin it you will notice the abdominal muscles contract, and with the majority of cows they will not give their milk down so well as if manipulation be not followed.

Q.—Taking into consideration the labor necessary to clean this machine, is it a labor saver?

A.—With a large number of cows, yes; but with a small number, no.

SELECTION OF A DAIRY SIRE.

By R. S. Stevenson, Ancaster.

I am sorry this subject has not fallen into better hands. It is easier to pick out a bull for production of beef than it is for the production of a dairy cow; the machinery for the production of the milk is all inside of the animal. The average production of the cows of Ontario is only some three thousand pounds of milk per year, and if you will figure up what that comes to, you will find that it will only produce enough money to pay for the feed of the cow, and there must be a great many cows that are not even giving three thousand pounds. I think it is up to the dairymen to try and improve the milk capacity of our cows. We keep on feeding these cows just for fun. We would be better off if we would get rid of them. How are we going to improve? The great basis for improvement of our dairy cattle must come from the sire. Of course the wealthy man might go out and be able to buy a number of good profitable cows, but that does not apply to the ordinary farmer. There is nothing to prevent us from improving our herds by breeding. If you want to improve your dairy herds, it will not do to pick out a beef type of bull. We have to look at the pedigree of the dairy bull. He may be a pure bred bull, and a good individual to look at, but that is not sufficient. We have got to know what kind of a mother he came from. We want to find out that he came from a producing cow, and the further back you go in tracing that bull, to see whether he came from producing cows, the more likely he is to be a bull that will get you good cows. The bull cannot transmit something to his off-spring that he has not got himself. You must not be led away by the fact that he is a handsome individual.

There are breeders, especially on the other side, who keep a bull especially for show purposes, and keep another bull for breeding purposes; simply because this show bull has not come from a line of producing cows. Another thing that you ought to know is that your bull comes from a cow that had a perfect udder. If you breed from a bull whose dam was defective in the udder, the probabilities are that a large number of that bull's daughters will go wrong in the udder. It has been found out, within the last few years, that a bull has a great deal to do with the quality and shape of the udders of his daughters. You should also see that he comes from a free milking cow, and not a tough milking cow, because we know that a tough milking cow is an abomination. In selecting a bull, I would also examine him to see that he had four well placed rudimentary teats, and see that they are well placed, that is, wide apart. A bull that has that formation is more likely to get you cows that will have nicely shaped udders. We are trying to breed our dairy cows with an udder that has a long attachment to the abdomen; that is desirable for two or three reasons. If you have cows with low udders, they are objectionable, especially if the cows have a trick of standing down in the gutter of the stable, because the udder gets in contact with their dirty feet, and they have to be washed before you can milk.

I like a bull with masculine appearance, as a bull with a good masculine head, is more likely to be a prepotent sire. I think it is an objection to have a bull with a cow's head. I like a bull with lots of life and energy. I think we are running our stock down in this country, simply from the fact that we are breeding continually from young bulls. I think it is a great mistake. W should be governed by nature in these things. We know that our native deer are as good as they were years ago. How does nature manage that?

In the state of nature the male has got to fight for the possession of the female, and the biggest, strongest, and most robust male has got the females all around him. It might be well to breed from a young bull occasionally. It is hard to sell an old bull, and the result is that a bull is used a couple of years, and then he is turned to the butcher. In a great many instances, the young bull is bred to a young female, and I am quite satisfied that it is against the laws of nature. There are often chances to buy a good old bull, and you can generally buy them a great deal cheaper than you can a young bull. With a mature bull you can easily know what kind of stock he is going to get, because his work is there to show for it. A good many people are afraid to buy an old bull, because they think he will be cross. For my part, I think all bulls are cross, and that is the only safe way to treat them You generally find it is the quiet pet bull that kills the man.

Q.—Would you recommend an old bull?

A.—It would depend a great deal how he had been used when he was young. There are a great many of our bulls almost impotent when they are four years old, because they were worked to death when they were two years old. A bull that is properly used should be good until nine or ten years old.

Prof. Grisdale: You judge a good deal?

A.—I have done a little at it.

Q.—You said in the course of your remarks, that a very common practice was for breeders to keep what they call a show bull, and to use another for breeding purposes. What do you mean by a show bull?

A.—There are several breeders on the other side that are in the habit of doing that. A show bull is a bull that fills the eyes of the judges and the public.

Q.—Why should he fill the eyes of the judges?

A.—That is what I would like to know. There is something wrong about it; it is not right, but it is done.

Q.—Do you think you could distinguish a bull that could breed a good dairy stock, could you pick them out?

A.—No, sir; not on his appearance.

Q.—What would guide you in selecting this bull?

A.—I say it is the most difficult thing in the world to go to pick out a dairy bull from his appearance. I do not think any man can do it. You have got to know that he comes from a producing female.

Q.—Can you be guided by general confirmation?

A.—You can, to a certain extent.

Q.—You think, when a man goes in the ring to place a number of bulls, it is a pure gamble?

A.—As far as getting good producers is concerned, it is. He has got to know the bull has got the power in him.

Q.—According to that, we might as well leave our dairy bulls at home?

A.—That is my belief.

Q.—Is there anything in a bull that would indicate his power to transmit his likeness on his off-spring?

A.—There is nothing certain, we do not want him with beefy quarters.

Q.—Are you in favor of using pure bred bulls in every case?

A.—Certainly; I never dreamed of using anything but a pure bred bull; because if you breed from a grade, you are more apt to get an inferior animal.

Q.—Do you permit your stock bull to serve your grade cows?

A.—Yes.

HOW TO KEEP COW RECORDS. (ILLUSTRATED.)

By C. F. Whitley, Dairy Commissioner's Branch, Dominion Department of Agriculture, Ottawa.

The question of keeping cow records is of great importance to every farmer keeping dairy cows. Everyone will admit that dairying is a progressive science; we know more than we did this time twelve months ago, and we should always be seeking to improve our methods in connection with this great business. The man who is going to make the greatest success with his dairy herd is the man who keeps cow records. They are also valuable to the breeder, the man who wishes to sell dairy cows on their certified record of milk production. It is a live question, this improving the record of the average cheese factory and creamery herd by the system of keeping monthly records. There is no doubt but that the man who keeps a record is going to be able to weed out the poor cows, to breed the very best cows, and in this way to improve his herd.

The work of organizing testing associations is under my charge. Dairy farmers becoming members agree to keep a record of each cow in the herd, weighing the milk night and morning three days a month, a very simple thing to do. We have a form issued free for taking the records of eighteen cows every tenth day, morning and evening; at the same time a sample of each weighing of milk is taken, and at the end of thirty days the composite samples are sent in to the testing station. In 1904 a test of this nature was conducted at Cowansville, Quebec, on the initiative of Mr. Fisher, the Minister of Agriculture, after talking with Ex-Governor Hoard of Wisconsin. "Hoard's Dairyman" has undertaken a series of "cow census" investigations, and the results, as brought home to the farmers, have been most remarkable in pointing out, not only the poor cows, but also the good ones. Mr. Fisher decided to start the work in Canada, and Cowansville was selected as the first point.

Last year we bent our energies towards further organization, and we now have sixteen associations in Ontario and Quebec. We have three in Ontario, one near Ingersoll, one at Brockville, and one at Princeton. These association records bring home this particular lesson, that averages as a whole are very unsatisfactory. Individual records are imperative. There are some men whose herds showed cows running 1,300, 1,400, 1,600 lbs. of milk, while the average of the whole herd was only 918 lbs. per month. You cannot judge milk as you can something that is tangible and solid. It loses its identity immediately after it is milked. You have not something that you can touch and handle like poultry, cattle or grain: once the milk goes into the milk pail you cannot get at it to test it in any way. The only possible time is at the moment of milking each individual cow. We have found that if the record form is close by a scale, it will only take about thirty seconds to take the weight of the milk, and at the same time to open the bottle and pour in a sample for testing. Nobody can say that is too much of a chore. It is something that is absolutely imperative, because very often the poorest cow is the one that you think is doing well. The converse is true. One man showed me what he thought was his poorest heifer, one that he was intending to get rid of. He has a well selected herd of cows, but that particular one that he was going to dispose of will give him over 10,000 lbs. of milk in twelve months, if she goes on as she promises. He considers he has been abundantly well paid for all the time spent in testing, by the mere fact of keeping that one heifer.

Up near Ingersoll one herd started off with an average yield of 1,024 lbs. of milk in June; that man might have hugged himself and thought he was doing well; but there is apt to be a very rapid shrinkage in July, the average was 842 lbs; in August 660, and September 631, a shrinkage of 38 per cent. from June. A neighbor of his started off not nearly so well, but he kept up far better, and between these months the shrinkage was only 15 per cent. If the first man's yield in September had been as high in proportion, he would have had about 2,800 lbs. more milk in that month, and that means he would have had $28.00 more from the factory for that one month alone. What is the explanation of that rapid shrinkage in one case and the slow shrinkage in the other? It is principally care and feed; one man is looking after his cows in the very best way, and the other man is not feeding them as well as he ought. One man was feeding oat-chop through the whole summer, and looking after the care and comfort of his animals. He has ensilage and root crops, provides shade and abundance of water, sees that they are free from annoyance from flies, and he milks regularly at the same hour morning and evening.

In the association at Brockville we have two men of the same name and not of exactly the same methods; one keeps six cows, and in five months of this year, from May to September, he had a total yield of 30,984 lbs.; but a neighbor milking twelve cows, double the number, only got a small fraction more milk in the same time. Energy going to waste!

A MEMBER: Were these two herds in about the same time of lactation?

A.—Just about.

Q.—That would make quite a difference?

A.—Yes, it would. I am almost sure all these cows calved about the same time in the spring; they were practically in the same condition.

Mr. Whitley here illustrated from charts the difference in herds, how a greater yield could be secured by proper care and attention to the cows, and how some men by keeping records had increased the yield of their cows to a wonderful extent. Continuing he said: We wish to form more associations. We have formed three more these last few weeks, and if any one wants any more information, I shall be glad to give it. Copies of the forms we use, the by-laws, and the bulletin we have issued on the subject I shall be very glad to send to you at any time.

Q.—Would you advise a man to feed grain?

A.—Yes, I would; one man near Ingersoll feeds grain all the year round and it pays him abundantly. The best record we have in the neighborhood of Cowansville is a man who feeds grain every month, and he is perfectly satisfied with it.

Q.—Do you mean to feed grain in the summer when the cows are on the grass?

A.—Yes.

Q.—How do you do that?

A.—I generally do that while we are milking; all dry meal.

A MEMBER: I saw a cow fed this summer dry chop in the stable while being milked, and she got quite sick, and the man believed it was from feeding too much.

The CHAIRMAN: It might possibly have been owing to the concentrated form in which it was fed.

MEMBER: It was oat-chop.

A MEMBER: We feed about 5 lbs. of pea chop a day, and after it ran out we started to feed corn-chop, and we were surprised at the difference in the flow of milk; we got 20 per cent. difference in the flow of milk from the corn-chop.

Q.—Would it pay to feed bran at $18.00 a ton?

CHAIRMAN: I know there are a great many who think they are making money, and they pay a great deal more than that for their bran.

A MEMBER: I think it would depend upon the price of their food products.

Q.—Have you had any experience in feeding alfalfa?

A.—Cattle gain on alfalfa if they get nothing else, that is, matured hay.

Q.—Has anyone had any experience in feeding alfalfa just as pasture?

A.—I have had it for hogs alone; I cut it three times. You should not wait until it gets too dry before you cut it.

Q.—Do you consider roots a substitute for bran?

The CHAIRMAN: Roots have a wholesome effect upon the physical condition of the animal.

REPORTS ON POULTRY EXHIBITS AT THE WINTER FAIR, 1906.

BY J. E. BENNETT.

Barred Plymouth Rocks: At the Winter Fair, take them all round, I think they made the largest and best lot ever there. First cock, good color and grand shape, good legs and comb, tail a little ragged; second, another good bird, but darker and not such a nice blue; third, fourth and fifth, not much between them. Hens, the best lot I ever judged. First hen, a real beauty, grand color and shape; second, another fine hen, hardly ready, otherwise would run first very close. The rest of the class right up to tenth, any one of them fit to win a first. Forty-eight cockerels and a good lot, but I have seen the winner a little better. First, grand in shape, very fine in barring, off in comb and under color, but a real good one; second, another grand bird, better in comb and under color, but not yet ready; third, I like his color better than any of them, but he was off in shape, especially very flat in breast. The rest of the class good birds, but no real high-class ones. Pullets like the hens, the best lot ever shown at the Winter Fair. First, the best pullet I think I ever handled. She was grand in every way; second, another real good one, very fine in barring and splendid color, but not as far advanced, and like the hens up to the tenth, the finest lot of pullets ever put together here, and there were lots of real good pullets left.

White Rocks: A very large class, but I did not think there was any improvement in them from last year. First cock, very white in color, not so nice in the shape of back as might be; second, another very fine bird, but not quite so white; third, not any too large. There was one very fine old cock with a little off color in wing that would have stood well up if this fault had not been there. It seemed very hard to get them free, so many with the cream or yellow in them. White hens, a little better than the cocks. First, a real good one, grand shape, fine in comb, and a real good white color; second, another very fine hen, but not in the condition of first; third, very white and nice shape, but looked small with the other ones. Rest of winners very good. Cockerels, a very large class. First, a real dandy, far ahead of anything else in the class, grand in shape and good in legs, and as white as a lily; second, another very white bird, but not filled out yet, should make a good one; third, another good one in color, but will never be too large. Quite a few with cream and not ready yet. Pullets like the cockerels. First and second, to real good ones, and not much to choose between them. First, a little larger; third, fourth and fifth, very good birds, and would be winners if the others were away from them. This was the best class in the White Rocks.

Buff Rocks: A larger class than last year, and very good birds among them. First cock, a real bluff, very even in color, rather rough in comb; second, another very nice colored one, but not yet ready. First hen, good in shape and very even in color; second, fair; cockerels a large class, but outside of first there were no real good ones. First was an excellent bird all over. He was far the best of all the Buff Rocks, he was a nice golden buff from head to tail, grand shape with good legs; second, nice in color, but young; third, fair. First and second pullets very nice; would like to see the buff rock breeders try to get them more even in color.

American Dominiques: Far better than last year, but still want a lot of improvement. First cock, one of the best, both in shape and color, I have seen in a long time; first cockerel fair, but high up in legs. Rest of the class very fair.

By Mr. L. G. Jarvis.

Polish: I have seen a larger entry of Polands at former exhibitions, but for quality, I think, taking all varieties into consideration, they were up to former shows held under the same auspices. I handled every bird very carefully, comparing them in the same light, side by side, and to the best of my ability placed the ribbons where they rightfully belonged. In this class I do not think it necessary to explain the difference between the first and second prize specimens, as the entry is small in each variety, probably only two pairs of old and two pairs of young being entered in each variety.

Dorkings, Silver Grey: A very fine exhibit, the best I have seen for years. First cock a grand one, silvery white, with lustrous black on breast and body color, nice comb, in shape all Dorking. Second, good shape, large, but striped a little too heavily in hackle and saddle, body color good.

Third, a good bird, not as stout in frame as 2nd, hardly as clean in color. First hen a nice one, beautiful color, great size, hard to find fault in any section. Second, not as clean in color, a trifle "bricky" on wing. Third, a trifle dark in plumage. First cockerel very fine, good comb, grand color, extra large with well developed body. Second, well up to first in color, not as prominent in breast shape, or as lustrous black in breast and body color. Third, hardly developed, fair color, will show better when more matured. First pullet extra fine in color, could not fault her in shape, wins easy. Second, not as good in color or shape. Third, good shape, but a little dark in color of plumage.

Colored Dorkings: Not as large an entry as last year, but some very fine birds shown. First cock, nice condition, fair color. Second, not in good show condition in several sections, might show better later in season. Third, fair. First hen good color, grand shape, an easy winner. Second, not as nice in color as first, fair shape. Third, fair. First cockerel good one, wins easy. Second, lacks shape. First pullet, good color, not large. Second, too high in color of neck, very fair in shape.

White Dorkings: First cock, good condition, good shape, could be a little whiter in color. Second, a larger bird but not in as good condition as first. First hen in fair condition, hardly as deep in body shape as we should like. First cock wins over 2nd in condition. Nothing special to mention in chicks, not up to quality of former exhibits.

Houdans: First cock, very even in mottling, good crest and beard, great depth of body, stood well on legs, well toed; second, as good in shape, but too dark in several sections; third, not as distinct in mottling. First hen, a good one, very even in color, white very distinct from black, good crest and head; second, hardly as even or as strong in color; third, smaller, off in color and primaries; first cockerel very evenly mottled, free from purple in black, good size, well toed; second, two dark in several sections, will make a better cock; third, about equal to second, but still darker; first pullet a nice one, in color hard to fault; second, lacked depth in color; third, not even in mottling. The finest pair, apparently, without handling not placed as they had feathers on shanks.

Creve Coeurs: First cock a nice one, lustrous black, good crest and beard; second, not as rich in plumage; first hen, good color; second not quite as good in color; first cockerel, good color; fine crest and beard; second not as good in color.

La Fleche: A small entry, first cock a good one, rich in color; second, lacked in color to first; first hen good color, nice comb, an easy winner; second, quite purple in plumage; chicks hardly matured, only medium in quality.

A. O. V. Fowls Class: A large entry, being chiefly made up of Silver Pencilled Wyandottes, and some extra fine specimens of this variety were on exhibition. An unnoticed pullet, being cooped away from the others, would have been in the money if seen at the time we were judging the class, but book had been closed, and when my attention was called to the mistake I mentioned the matter to Rev. Mr. Bartlett, the owner, who good naturedly allowed the ribbons to remain where placed—he had already won well in the class.

Toulouse Geese: A grand exhibit. I found three old pairs entered as young, so had to throw them out. I might say for the information of those that exhibit that variety of geese that you cannot produce a prominent "dewlap" throat appendage the first year, so it is very easy to distinguish the old from the young birds.

Ebden Geese: A large entry, competition keen. Nearly all the birds in class in fine condition.

Chinese Geese: Not a large entry but a few good ones.

A. O. V. Geese: Made up chiefly of African, was a very interesting class, winners extra fine.

Ducks: I might say that it was very difficult for me to handle the ducks, placed as they were, many of them in coops sitting on the floor and much too deep, as when they were at the back of the coop it was very hard to get their true color, and to get them out required a good deal of work, and not of the cleanest kind, as ducks are bound to soil the coops more or less, no matter what care has been taken to prevent it. I hope I succeeded in placing the awards fairly satisfactory, considering the difficulty in which I was placed. Rouen,—A nice class, the best we have seen for some time. I saw in the winning males a great improvement in breast color, more depth to the claret, and free from frosting. Cayuga,—A very nice class, winners showing great richness in color of plumage, carrying that lustrous green sheen with black bills. By closely comparing them 1 think I placed the prizes where they rightfully belonged.

Pekin: A very large class. I cannot say that quality, on the whole, was quite up to last year, yet we had a few extra specimens, in the 1st winners, I think equal with last year.

A. O. V. Ducks: Made up of different varieties, Mandarin, white top knot, wood and call. Another variety not yet admitted to the Standard, buff Orpington. Like all new breeds of fowl it will take some time yet to perfect them, to make them all buff throughout, but when perfected will be no doubt a very handsome duck, good size, and will come in with the utility varieties. I hope Mrs. Dawson may succeed in securing the desired end, and when brought to a uniform buff, that, like the Indian Runners, receive at the hands of the Standard makers, the same consideration as other varieties have in the past.

Muscovy. A nice entry made up of colored and white, colored predominating both in quality and quantity.

By Wm. McNeil, London.

Black Javas: Not a big class but they were good. First cock, good shape, fine in color; 1st hen, splendid shape, good color; 2nd, close up. First cockerel, a good one, good color, fine comb, a little short in back; 2nd close up. First pullet, a nice one, good head and comb, splendid in color; 2nd fair.

Mottled Javas: 1st cock, good head and comb, nice length of back, good shape and color. First hen, nice head and comb, good length of back, well mottled, grand in color; 2nd, a fair hen. First cockerel a good head and comb, nice color, good shape; 2nd, close up. First pullet a good one, good head and comb, nice length of back, well mottled; 2nd and 3rd, both good.

White Minorcas: A good class in quality. First cock, good head and comb, fair ear lobes with a nice back, good length of leg and fair in color; the second hardly as good in comb, but otherwise good; 3rd a fair bird a little short on legs. First hen, splendid head and comb, good lobes, nice length of neck and back, tail well carried, good length of leg and nice color. Second a good hen, but not as good in color; 3rd hen, a fair hen, not as good in comb and lobes, balance of class close up. First cockerel with good comb, wattles and ear lobes, splendid length of back, nice tail, good length of leg; 2nd and 3rd, close up, balance of class good. First pullet a good one, nice head and comb, good length of back, nice tail, good length of leg; 2nd and 3rd, two more good ones, close up to first, balance fair.

Andalusians: A fair class. First cock, a good bird, but hardly in show condition, medium comb and ear lobes, a little rusty in hackle, splendid back, good tail, nicely laced breast; 2nd, another fair bird, balance of class were medium, but all too dark. First hen was a nice one with good comb and ear lobes, nice neck, good back, nice tail, well laced breast; 2nd was also close up with good comb and lobes, a little dark on back, with a good laced breast, balance fair. First cockerel, a good one, splendid comb, ear lobes and wattles, nice neck, good back and tail, with a well laced breast, about the same description for 2nd and 3rd, balance of class medium. First pullet a good one, good comb, ear lobes and wattle, nice neck with a well laced back, good tail, well laced breast; 2nd and 3rd both good; balance of class fair.

Red Caps: A splendid class. First cock, good comb, wattle and ear lobes, nice neck, good back, splendid tail, good shape; 2nd, another fair bird; 3rd close up. First hen, a good big one, comb a little large, grand in color, splendid shape, and nicely spangled; 2nd, and 3rd, not good, balance of class fair. First cockerel, a nice one, fair comb, good lobes and wattle, nice neck, good back, splendid tail, good breast; 2nd, another good one, nice comb, good lobes, neck and tail and breast, balance of class good. First pullet, a nice one, nice comb, ear lobes and wattles good color, nice shape; 2nd, another good one, balance of class fair.

Sultans: First cock was a nice bird, fine crest and beard, nice shaped back, and good white with good hocks; 2nd, another good one but creamy First hen a good one, good crest and beard, nice color, good shaped back, nice length of leg, good hock. First cockerel, a nice one, fair crest, good beard, nice white, well booted; 2nd, another good one, but a little creamy. First pullet, another good one, good crest and beard, good shape and color, legs and toes well feathered; 2nd, close up.

Silkies: Good class. First cock, nice bird, fair crest, good white all over, nice leg and toe feathering; 2nd, a little out of condition. First hen, a good one, nice crest and comb, good leg and toe feathering, good in color; 2nd, another nice one. First cockerel, a grand bird, nice crest, comb not good in color, splendid plumage, with good leg and toe feathering, but a little large; 2nd not in as good show shape. First pullet, a little beauty, would do to show other than as a hen pullet; 2nd and 3rd both good, balance of class fair.

Hamburgs: A grand class, and I was more than pleased that I had the privilege of judging them. First golden spangled cock, good in symmetry, nice in color, with a good comb, wattles and fair ear lobes, neck and back grand in color, tail splendid, without any purple barring; 2nd cock, another good one, but a little too dark; 1st hen, grand in color with fine spangling; 2nd and 3rd both good ones. First cockerel, nice bird, good comb and ear lobes, splendid shape, grand hackle and saddle, with a well spangled breast carrying a grand shaped tail with good color; 2nd, another good one, but a little lighter in color. First pullet, very rich in color, with nice spangles, good head and comb, and a fair lobe, hackle and back good, tail about the right shape; 2nd and 3rd both good. Silver spangled were a fine class. First cock, fine comb and ear lobes, splendid in color, with the right shaped spangle, but hardly in show shape; 2nd another good one, wants about two weeks to be ready; 3rd, fair bird. First hen, splendid in color, good spangling, grand breast, good back color, but a little too long for a good Hamburg; 2nd, another good one, but not in as good condition; 3rd, a fine large hen, but a little too old to show well. First cockerel, grand bird, fine comb and wattles, the right shaped spangles and a good tail; 2nd was little choice between the two; 3rd, nice little bird, but still not in the same class as first and second. First pullet is a good one, good head and comb, nice head and lobe, good neck and back, nice tail, with a grand breast, spangles hardly large enough; 2nd, a nice little pullet, with nice head and comb, good shaped spangle, but not as showy as the first; 3rd, a nice pullet, but too young, grand spangling. She will make a good hen. Golden pencilled; there was some good ones amongst them. First cock, good comb and ear lobes, and a grand tail; 2nd, a fair bird; 3rd, another medium one. First hen, a grand one, an old winner in the pink of condition; 2nd, another good hen. First and 2nd cockerels, both easy winners. Third and 4th, fair cockerels; pullets all fair, but nothing special. Silver pencilled,—1st cock, an extra good bird, in size and color, with a good comb, wattles and ear lobes, with a grand tail. This is one of the best birds I have seen for some time. Second, a fair bird, a little white in face, otherwise good. First hen easy winner, splendid head and comb, well pencilled all over; 2nd, another good one; 3rd, medium. First cockerel, very fine large bird, with grand tail, a little off on comb, but splendid on lobes, just about as good as first cock; 2nd and 3rd cockerels, both nice, but too young. First pullet, about as good as first hen; 2nd, another nice one; 3rd, very nice, but hardly pencilled up to the throat. Black Hamburgs. This was a grand class and every bird fit to win but one cockerel that had a little white on face. First cock was about the best Hamburg in style and color that I ever saw; 2nd, another good one, but a little old and too large in ear lobes. First hen a grand one, good symmetry, fine head, comb and ear lobes and a nice green black all over; 2nd, another fair hen, but a little purple. First cockerel, just about as good as first cock; 2nd, another good one, grand in color; 3rd, very fine, but a little rough on legs; 1st pullet, just about as good as 1st hen; 2nd, close up; 3rd, a fine one, but a little rough on legs. She will make a fine old hen, balance of class good enough to win.

By Richard Oke, London.

Brahmas: Light Brahmas. A big class with good quality. I noticed in a number of the old birds throughout the Asiatics that they wanted a little more time to develop length of feather, being a little raw. First cock in good fit, nice neck and saddle, sound flights and good width of back, with plenty of size: second, hardly finished, nice type, good flights neck and tail; third fails a bit in size, but a good one. First hen, typical shape, grand size, nicely laced back, well finished tail, just in prime condition to show, being very pure in her top color; second, hardly in condition of first, nice length of back, with good average flights; third, another good hen, with nicely laced neck, hardly at her best. First cockerel, a big strapping fellow of good Brahma type, nice color throughout with a well spread tail; second, fails in size and finish, yet a good one; third, close up, not very much to choose between them. I noticed in this class that several, otherwise, good birds failed sadly in flights, which kept them behind the money. First pullet, well developed, good head and neck, length of back, and well spread tail; second, good neck, nice type, fails a bit in size; third, another good one, close up. Dark Brahmas up to the average in numbers and quality. First cock, a big bird, hardly ready, nice neck and saddle, very good in his black; second, fails somewhat in top color and fluff; third, another good cock, not so pure in color, but a good one. First hen, large, evenly pencilled throughout, good type; second and third, fail pencilling and color. First cockerel, well matured, good striping on neck and saddle, ticked a bit with white on breast, in nice condition; second, hardly finished, good, sound color, will show to better advantage with more age; third, not so good in his black. First pullet, a bit young, nice neck and top color; second, about the same type, not quite so forward; third, fails a bit in pencilling of back. and not that grey cast of those in front.

Cochins: Buff Cochins. More numerous than usual, grand quality throughout. First and second cocks a grand team, nice color and splendid length of feather, first bit better finished in tail; others close up. First hen a wonder for length and softness of feather, with a very level color throughout, all curves; second and third, typical shape, but fail somewhat in length of feather. Cockerels and pullets a strong class, and no doubt some of the top-notchers will change places with a little more age, having abundance of feather, but hardly ready. I noticed some of the forward birds in these classes fail somewhat in under-color. White Cochins rather small class, but nice quality. The first old pair will take some stopping with a little more time to finish, very pure in color. Chicks a nice class, hardly ready yet. First pullet fails in footings, but forward. Blacks a nice lot, with good color and length of feather.

Langshans: Black Langshans. Old cocks a bit raw, ample size, good color, type, but want a little time to finish. First hen grand type, color and size, in the pink of condition; second fails a bit in size, and hardly the finish of first; third a good hen, fails somewhat in color. First cockerel a bit coarse in comb and head, nice type, size and color; second and third nice style, good head points, fail a bit in size, but real good. First and second pullets well grown, grand color and type, easy the pick of the class. White Langshans, a noticeable improvement in pureness of color over former years, good type and size, the young stock being well advanced.

Orpingtons: Buff Orpingtons. Throughout the buff classes I noticed quite an improvement in uniformity of color, but an inclination to the Rock type. First cock a nice color, but fails a trifle in type. Second cock very good type, but a little light in color, nice size third, a rose comb, very good type and color, fails somewhat in size. First and second hens nice types of body, broad and low set, good feet and legs, I think in advance of former years in nearly all sections; balance of winners fails somewhat in that desired type. First cockerel a dandy, beautiful, even color throughout, of about the desired hue, nicely proportioned body of the desired type; his worst fault, according to my idea, being coarseness of head, he will take some beating at later shows if he gets there; second another fine cockerel, better in head points, but fails somewhat in development of the cockerel ahead; balance of winners nice uniform color, but fails in that desired type. First, second and third pullets very uniform in color of about the right shade, nice clean tails, and with a little more age should finish them in type; balance of winners a nice uniform lot, but hardly in a class with first, second and third. Black Orpingtons, a big class, nice type and color, an improvement over last year in nearly all sections, some models in type staged in bad light. A.O.C. comprised some real good whites and Jubilees, a nice lot through, and a decided improvement in type.

BY SHARPE BUTTERFIELD, WINDSOR.

Partridge Cochins: Cocks, 7; a fairly good class of birds, lots of room for improvement. Cockerels, 6; first, second and third very well grown and very good specimens; first a grand bird, if shorter on legs would add greatly to his value; the class was very creditable, and from them I shall be able to say next year some really high class cock birds will be shown. Hens, 7; first a grand color and grandly pencilled, she would be a much better bird if longer in feather; second another very good bird, but not so good in pencilling; third needs more time to be at her best. Pullets, 6; first a gem, about the only thing one would ask for her to have would be longer feather; second pullet another good one, but not in it with first; third no doubt a good show pullet two months ago, but laying has taken away the gloss and finish. Still, the partridge class as a whole is much ahead of last year in quality.

Games, black reds: Cocks, 7; the whole class a grand lot of birds, and my giving my reasons, objecting to so much shawl on the necks of male birds last year, the birds are dead or they were not shown this year at the Ontario, and we must expect to see in future quite superior Standard black red Games. Hens, 10; first hen very shapely and short-feathered; second a grand hen, not quite so shapely in stern, but a real good hen; third another good hen; in fact, there was not even a middling good bird in this class, but all of good merit. Cockerels, 9; first easily the best male in black red Games, grand color, and was always standing in grand show shape; second not quite so nice anywhere, but was much of the same stamp of a bird; third rather a nice cockerel, may make a very good cock, but at present too loose in feather; balance of class very good. Pullets, 9; first a very nice short-feathered pullet; second and third very close up. In cock birds prizes had to be guided in some measure by the birds having good, sound legs to stand on. Brown reds—Cocks 6, first cock short in head compared to some placed lower down, but he had good legs and could use them; faults of second bird were too long in neck hackle-feather, and legs rather shaky; third cock easily first in everything excepting very weak, sprawling legs. Hens, 9; the whole class was very creditable, and while some had the fault of being too short on legs, otherwise I might have said there were two high class specimens, but they had to give way to birds more in accordance with Standard requirements. Cockerels, 6; just fairly good birds, the best of them not yet matured. Pullets, 4; a nice class, very creditable. Duckwings —Cocks, 5; first a very fine bird all over; second a very good bird, but not so tall or reachy; third a very nice bird, following close to second. Hens, 4; a very good class. Cockerels, 3; first a very promising bird, and so was the second, third a fair bird. Pullets, 4; a very nice class. Pyle—Cocks, 4; first an easy win; second too small and not reachy enough; third a grand bird, except leg weakness. Hens, 4; first a good color, her only fault not long enough in neck; second hen not so good in color, otherwise quite equal to first. Cockerels, 6; first a grand, promising bird, second another good bird, but was a little out of sorts; third looks like making a nice bird when matured. Pullets, first very nice color and very nicely cut away in stern, and fine in tail; second a nice pullet, but looser and broader in feather; balance of class very creditable. Indian Games—Cocks, 6; first just about as wide across the shoulders as length of back, and nice strong legs of medium length; second a very similar bird excepting comb, and breast slightly splashed; third a grand plumaged bird, but not wide enough across shoulders. Hens, 10; first hen easily the best and cleanest laced hen, a very good all-round hen; second a little better in shape but not so good in ground color; third a very good hen; in fact all this class was very creditable. Cockerels, 11; first fully matured and a good one; second and third good birds but three months younger. A good class, hardly any of them not fit to win at any other Ontario show. But the winners at the Ontario have to be pretty choice birds. Pullets, 9; a grand class. First a very good shape, beautiful color and lacing; second a grand, shapely and fairly well pencilled pullet. Indian Games a really creditable class of birds. Sumatra Games, cocks, 4; first the grandest and much the best in saddle feathers; second and third both good birds. Hens, 4; very good hens and prizes fell to best shape and color. Cockerels, 5; a nice class. Pullets, the same; just a fair good class. Birchens, first cock a very good bird; also first hen very good in color and Standard requirements; second and third hens were so very much sunburnt about their heads it would not surprise me to hear they were imported from "Afric's sunny mountains."

In Game Bantams and ornamental Bantams I fear I shall take up a great deal of your valuable space, for much as I can say of them will only be the half truth told. When I reported to the secretary on hand, in his retiring manner, he said, "You will have your hands full of Bantams," and when I went to look at them I concluded he was right, and I thought my brains, as well as my hands, would be pretty well tired when I got through. The Bantam classes, probably the largest collection ever together, 660 in number, a great big show of themselves, and not a poor exhibition bird in the lot. And it is no easy task to place the awards on that number of birds, and see everyone when awarded were up all smiling—glad to see they were amongst the winners even if they only got a fifth in some classes. We should have more room and not have Bantams placed three tiers high, for in a great many instances birds are so nearly equal in merit that the favorable position of light and standing position often decides the award, when to reverse the places of birds in some cases would change awards. Game Bantams, black red, cocks, 7; first just a little darker in color than Standard requires, otherwise a grand shapely bird, hard and short feathered and the natural pose of the bird about 35 degrees from horizontal. An ideal shaped game or Game Bantam, after using a judging stick to have him straighten himself up, should hold that position quite a while and not, just as soon as he loses sight of the stick, stand about horizontal and his wings almost drooping like a Sebright. Those who saw the cock on the corner, first number in the class, will know now why I did not place him over the fourth. He was much the best colored cock, but the loose carriage of wings and tail made him give way to first, second and third. Hens, 16; first, second and third all high class birds, and not one a great deal better than the other. First very fine in tail, very narrow in tail feathers, and very hard and short feathered on cushion near the root of the tail. Cockerels, 9; first had a hard one to beat and that was the second. I saw the second probably twenty times during the show and he was always showing himself about perfect in shape and style, but first was not far behind him in that respect, but he had quite an advantage in wing color, neck and saddle, and, though slightly striped on saddle, he was a very perfect bird and, I was told, sold at the show for $75.00; third, a grand small bird and will always be in the money if in good show shape. I could have placed a fourth and fifth to good advantage, for out of the nine you could easily say six were high class birds. Pullets, 13; first an easy winner in length of leg, small body, long neck and grand shoulders with a tail as fine as silk; second much the same, looked like two sisters; third another good one. In fact the whole class was good. Brown reds, cocks, 5; first an easy win, but breast too much splashed, have seen better; balance of class of cocks not even lemon in their colors. Hens, 5; first very reachy and small body, she looked as if she had not shed her old feathers or would have been an easy winner; second and third a little larger and looser in body feathering. The class of hens, as a whole, was good. Cockerels, 4; first a grand young fellow and if all goes well with him he will be a fine cock for next year. As to the rest of class, some were too young to say much about, and some not good enough to say much of. Pullets, 11; first grand all over, both in color and style, grandly cut away in stern and very fine in tail and tail coverts; second and third both good pullets but not so hard in feather as first. I think the brown red pullets was the best and largest class of good ones I ever met; there were three grand ones which will be heard from again; not any fault to find with them particularly, only too young. Duckwings, cocks, 7; first just alone in his class for all around excellence; second another very good bird, but not as good in color; third another good bird; balance of class fair good birds. Hens, 6; first like first cock, an easy winner, she had the grandest of tails and very narrow in flights and very, very short in wing; second another good hen and so was the third, but looser and broader in feather; all in this class were very good. Cockerels, 6; first a fair, good bird and very good in color, which made him win; second the gem of all the Game Bantams in the show if he had had good colored wing bows, small in size, neat in every section and was always standing at an angle of 35 to 40 degrees, with the very finest of tails and perfect in tail carriage. I saw his counterpart at Wilkesbarre, Pa, in the first prize black red cock; third another grand bird, no doubt brother to the second, lacked greatly in shoulder color, otherwise a gem, for shape and finish. I have no means of knowing but feel sure first hen in this class was their mother. I left out a grand cockerel in this class for largeness of size and loose and broad long feathering. Pullets, 7; first and second no doubt sisters to second and third cockerel, small, neat and finished finely in tail; third a nice rangy pullet but broader and looser in feather. Pullets a good class. Pyles, cocks, 11; first a grand, small, evenly made bird just about perfect in every section, both in color and shape, and I hesitated whether not to award him the special for the best Bantam in the whole exhibit. He was the kind dreamt about, but seldom seen; second not so clean in color nor as distinct, but a grand bird; third, about his only fault was size, he had grown pretty large; fourth a grand little fellow but not clean enough in his white; fifth just as good as the fourth only his tail was hardly full length. This class contained seven grand cocks. Hens, 10; first and second two very short feathered reachy birds a little higher than Standard color but so much ahead in all other points entitled them to first and second; third a grand, short small bodied hen and did not show herself to the advantage of first and second; fourth a better colored hen than the three placed above her but she was softer and looser in feather. Eight out of the ten grand good hens. Cockerels, 22; more good birds in this class than I ever saw or met, not excluding the Crystal Palace. I did not expect in walking down the aisle to find such a quantity, and quality almost to throw away; first a grand poser, always in order, with a perfect tail; second black red cockerel just such another actor, always doing full duty; second a grand little fellow both in color and style, only lacks a few weeks more age to make him very interesting in any company he may chance to meet; third a peach, a gem all over, in wing, tail and finish, but not quite as distinct in his color. These three birds were so nearly equal that a judge could not have made a serious mistake in placing these three awards; fourth, fifth and sixth right in line three grand, small birds, and should these six birds meet at our Ontario as cocks next year it looks almost as if best in condition and fit will win. The greatest class of good cockerels I guess any man ever saw, reckoning all he had ever seen in his lifetime, and I shall suggest to the Association to let me award even to the tenth, if there be so many good birds deserving. Pullets, 23. In this class color, in some measure, had to give slight way, as in the hen class, but the six winners were full of quality and each and every one full of good points. 66 Pyle Game Bantams shown at our Ontario! I am sure we all can say never such a show of high class Pyles ever was in competition.

Game, white: Well this class has made very fast progress. A few years ago we used to see some grand ones in style and finish, but the undesirable willow legs kept holding them back from first prizes. While there were fourteen birds in this class, and all grand yellow legs, not even one with a willow shading. Notable amongst them was first cockerel and first pullet, away ahead of any I have yet met, full of quality, small in size, and as short and hard in feather as the best of any other class, and we may say the class of whites was very flattering to their owners. Birchen cocks, 2; first a very nice clean colored Birchen; second, a grand bird but not quite so nicely colored. Hens, 4; first hen quite equal in general make up to the very best of Game Bantam females shown; second followed her very closely; third right close up; fourth rather on the old fashioned order. Cockerels, 8; first an easy win for style, finish and color; second and third very promising youngsters; a very good class. Pullets, 4; first an all round good one in every section; second, a good pullet, and also the third. Game Bantams, any other variety, contained some very good birds both in blacks and Indian Game. The Game Bantam classes at Guelph will long be remembered by all the competitors for 1906 was surely the banner show.

Golden Sebrights: By far the hottest class ever shown in Canada and in cocks you could easily have placed six prizes. The gem of the golden Sebrights was first prize hen, small in size, full of style with the very finest of distinct lacing and, I might say, the ground color that is so much desired. Thirty golden Sebrights make a pretty good showing. In silver Sebrights the winning cock was away high up in the silver class; in fact, there were four good ones out of five entered. Hens, 7; first on the order of first golden hen, away ahead of her class; second and third good enough to win anywhere when first hen is not in competition. Cockerels; all the the winners very high class goods; same can be said of the pullets. Black rose comb, 38 in number, and a grand class of birds, and no doubt nearly every owner thought he was sure of first prize before he left home. First cock very small and finished right from head to tail; second and third close up to him. The most good cocks and hens I ever saw together. Cockerels, first quite ahead in his class for color, large tail free from purple, with about a perfect comb and ear lobe; second a smaller bird but a gem of the first water, and so was the third. Pullets; the winner was A No. 1 for color, smallness of size, ear lobes about perfection. This is the best showing ever held at our Ontario. Bantams, white rose comb; a grand show of grandly finished birds. Cochins, white; first cock quite a small good white bird; second, a little longer and full of style. Hens, 10; first just about as round as a ball, full of Cochin qualities; second and third hens very high class. Cockerels; a grand lot were the winners, fit to meet the best anywhere. Pullets remarkably good. Buffs. cocks, first a grand colored bird, grand cushion and even and sound in color both inside and out. Hens; never placed awards on three better hens; first not a shaft in sight; second close up to her, and the same the third. Cockerels; first a gem, closely followed by second and third. Pullets; first probably the best buff bird in the show, a rich golden buff from head to tail and not a shaft in sight, even on the fluff; second and third better in shape and good birds, but the color was hardly so grand as first pullet. Cochin, black, 53 in number. Black Cochin Bantams, as a whole, I may venture to say, the best lot ever brought together, and the absence of white undercolor was about nil, and even the whole four winners were good enough to win anywhere. The hens were marvellous, and so many good that smallness of size and green sheen was quite a factor in awarding the prizes. Cockerels and pullets just on the same order, and surely this class of birds ought to have had better light. I am sure one thousand dollars would not buy the outfit of black Cochin Bantams. It looked to me as if Dr. Fox had sent all his very best to our Ontario show. Partridge in poorer light than the blacks, 35; cocks, 9; first alone in his class, he was small and shapely and a grand Cochin in miniature; second and third grand birds, about their only fault too large. Hens, first, second and third small, grand shapely hens, and so equal in Cochin shape that the prizes were awarded to the best pencilled, and they were three grand pencilled hens. Cockerels; first cockerel like first cock, ahead of the class a long way, a Cochin all over and very long in feather; second and third would have been good birds if smaller in appearance. Pullets; first pullet small and grandly pencilled, and with good care ought to make a grand hen; second and third larger in size, grand in cushion and pencilling. An extraordinary class for Partridge Bantam, 35 in number. White booted, a good creditable class. Japanese, not as heavy classes, but they make up in quality what they lost in quantity for they were all good ones. Polish, bearded and unbearded, have made great improvements, especially in smallness of size and snow-white plumage. Any other variety quite a large class, 31 in number, and the winners grand specimens of their different varieties. If it would not take up too much of your valuable space I might have particularized more in ornamental Bantams, for there were lots of them deserving of special mention.

By James Anderson, Guelph.

Turkeys: The exhibit of turkeys was certainly the largest and best we have ever had especially in the M. Bronze class. The entries in the Bronze class were 54, in White Holland 21, A.O.V. class 15. In the two years and over class 5 cocks and 8 hens were shown. The first prize cock was a typical Bronze turkey, fine heavy bone, beautiful plumage which shone like burnished gold. The second was a very little behind, equally as heavy a bird with beautiful strong well colored legs and good barring on his wings, but the plumage not so good as the first. The third also a good, strong bird and well marked, but not quite as large as the first or second. The fourth prize cock was the largest and heaviest bird of the lot but on account of a growth on his foot, something like Bumble foot, I could only give him fourth place. Only for that he was the largest and heaviest bird in the show and I have no doubt would have taken first place. The last year's birds numbered 6 cocks and 8 hens. The first prize bird was very fine, beautiful barring on his wings, fine heavy bone, grand colored legs and good plumage. The second also good but scarcely so fine in plumage. The third a fine bird but a little bit leggy and not so brilliant a plumage as the other two. The 4th and 5th also good. Well bred Bronze turkeys not a bad one in them. All valuable birds for breeding and not overly fat. The hens were also fine. The first hen very good fine barring on her wings and grand plumage. The second not so good in plumage, a little too much white on breast feathers. The third, fourth and fifth are good hens and well marked but not so large as the first and second. In cockerels and pullets the entries were 13 of the former and 14 of the latter. The first prize cockerel was a grand specimen, beautiful Bronze and well colored legs, grand equally barred wings and tail. It will make a grand bird in another year. The second a little too leggy and not so good in plumage as the first, but a fine strong bone and well colored legs. The third, fourth and fifth good strong birds and though scarcely so large as the first and second will make good serviceable birds for breeding purposes.

The finest specimen of a young turkey pullet I have ever seen was the first prize in this class. She must have been hatched very early to attain such size and growth. She was well marked, fine wings, good legs and fine heavy bone, and if she lives another year she will be hard to beat. The second also good, but lacking in size and weight. The third a fine bird also. The fourth and fifth smaller birds but equally well bred and good markings. The whole 14 pullets were a fine lot. One of the finest and largest ones I had to disqualify on account of a black feather in one of her wings, no barring whatever; it was a pity to do so, as she was one of the best in the lot.

In the White Holland class there were some fine birds though not so large as I have seen them. The first old cock was a beauty, fine strong bone, and grand pure white plumage. The second good but the plumage not so good as the first and not so clean. The third, fourth and fifth fine birds but smaller and not so good in plumage. The first prize old hen was good but not as pretty a shape as the first hen last year, the feathers more loose and not so well placed. The second was even better plumage than the first but much smaller in size. The third, fourth and fifth nice well marked birds but smaller in size. The breeders of the White Holland turkey claim they do not wander away from home like the Bronze, and the flesh is more delicate and of finer quality on the table. In the A.O.V. class we had Black, Slate and Narragansett. The first old cock was a very fine specimen of the black breed, good length, wide breast and fine glossy jet black plumage. The second, a Slate, fine strong bird but the plumage not so good as the first, in fact all the Slate turkeys are deficient in plumage, black spots showing on the feathers of nearly all of them which of course should disqualify them as the standard says no black spots should appear on the wings or body. There were fewer of the Narragansett breed this year than formerly, and no buff turkey shown. The Narragansett is a very showy bird with beautiful black and white plumage, and very fine plump breast and often attains a very heavy weight and they claim they are as hardy as the Bronze. Upon the whole the exhibit of turkeys was the finest I have ever seen at our Winter Fair. and I have attended the most of them since the first one held in the Royal City of Guelph some thirty-five years ago. Some people claim they cannot raise turkeys on account of the Black Head or Roup, but in the forty years I have bred them I have never had any trouble with it. If the proper precautions are taken I think there is no danger, but as it is very infectious the best way to do is to kill the infected ones and burn or bury the carcass, and, now when turkeys are such a price, sales of young birds being made at our present show at $10 and $15 each, they are worth looking after.

By W. R. Graham, Manager Poultry Department, O.A.C., Guelph.

Utility Pens: The number of utility pens exhibited at the Winter Fair was not as large as we would have liked to have seen. The judges are somewhat at a loss to know why the Wyandotte men do not bring out exhibits of their breed. Wyandottes, Plymouth Rocks, Orpingtons and Rhode Island Reds are much talked of as general purpose farm fowl and one would think that the breeders of these varieties would make good exhibits in the utility classes. Possibly if money were available it would be best to have a separate class for each of the above mentioned breeds; perhaps another class for any other variety and then a grand sweepstakes for the best pen in the lot. We may look for something of this kind in the future, but just how soon it will come I am not in a position to state.

The pens that were exhibited this year, I think are an improvement over last year. The first prize went to a pen of Plymouth Rocks. The cockerel at the head of this pen was, in the judges' estimation, much the best bird in the class. This bird had a long keel and exceptionally well covered.

Our experience in feeding chickens and handling dressed poultry is that if you get chickens which have well covered breast bones before they are fattened, these birds present a much finer appearance when dressed. You will often notice that there is plenty of meat at the base of the breast, but for about half an inch at the top there is simply keel bone with no meat on it. The first prize pen was good in this respect. The second prize pen—the pen of Buff Orpingtons,—was nicer in type, *i.e.*, they were nice shaped breeds and low down with fine legs. Possibly this pen would appear to be easy winners, but lacked in meat covering of the breast. Had this pen been anywhere near as well covered as the first prize pen they would have won easily.

The third prize went to a pen of White Rocks. These birds were fairly well covered, but were a little too up-standing and coarse. The other pens that were exhibited lacked in type, also in the covering of the breast bone. Some do not seem to know what we want in the utility pen. What we look for is good healthy birds of medium size, rather blocky in type with good breast development and the breast well covered with meat. The scales on the legs should not be too coarse and rough as these are usually associated with meat that is coarse and stringy.

Dressed Poultry: The exhibit of dressed poultry was not as large as has been seen in some previous years but there were quite a number of new exhibitors, which is encouraging. In conversation with some who have shown dressed poultry other years and not showing this year, their reason seemed to be that the prize money was not large enough. I realize that those who are showing live poultry believe that the dressed poultry men are getting larger prizes in proportion than those who are showing live poultry, but there is this great difference,—those who show live poultry and win prizes have considerable advertising honor which has a cash value that is hard to estimate, in the disposal of their stock. In dressed poultry, as I see it, it is a straight cash transaction. While it may be of considerable honor to win in the dressed poultry class I do not know that it has any cash value in the selling of stock, hence what an exhibitor makes is simply estimated by the cash returns that he receives. It does not take a great deal of time or money to feed the chickens, but takes considerable time to select birds that are suitable for the purpose and one wants a fairly large quantity to select those that are capable of winning. In addition to this the dressing and shipping, etc., means a lot of time and very tedious work.

If each of our best feeders was to show a number of birds in each class, my impression is that the cash returns to each man would not be very great. We have not had, except one year, very keen competition. I believe there is a little tendency on the part of the breeders, especially in the County of Wellington to give and take as it were, that is to say, if one is going to feed heavily this year. the other chap drops out.

I have been informed that if the prize money was increased we would not meet this difficulty, but at the present time I cannot see where the money is coming from to do this. There is another side of the question and that is, if we encourage what may be termed the professional feeder, it might be at the expense of keeping out the amateur, although amateurs, or what are supposed to be amateurs, often make excellent exhibits.

In the Plymouth Rock class there were some exceptionally fine birds. Special mention might be made of the first prize cockerels and first and second prize pullets. These birds are about the ideal size, weighing between five and six pounds each, were all of very white color, and the breasts were exceptionally well covered with meat. The keel bone was long. They were well dressed and the quality of the flesh was excellent. The legs were not rough, in fact, everything indicated to a good pair of chickens. I think these are, as good chickens as have ever been shown. The pullets won the sweepstakes and their closest competitors were the cockerels shown by the same exhibitor. Had there been first, second and third sweepstakes, the two pair of pullets and the pair of cockerels would have won. The other exhibits of Plymouth Rocks were fairly good, but I am inclined to believe that the feeders do not pay enough attention when selecting their birds for feeding purposes to get them well covered on the breast before starting to feed. By this I mean to get the meat extending to the very top of the breast. There were several good chickens that were nicely fattened, but lacked meat on end of the breast bone, which spoiled their appearance. In the Wyandotte class the exhibit was not very large, but the quality was fair. There was closer competition than there was in the Plymouth Rocks.

The first and second prize pair of Wyandotte cockerels won largely on the meat covering of the breast. Other birds were about as well fattened and as well dressed. The main difference being that the first and second prize pair had more meat at the end of the breast bone. There was a pair of Wyandotte chickens of nice color and good chickens, but the breasts were not well covered. These were shown by a new exhibitor. Had he taken a little more pains in the dressing of these birds and had shaped them, they would have presented a much finer appearance. It will be noticed that the judges are to be guided by the best and best dressed. It was in the dressing where these chickens failed.

In the Wyandotte pullets, the exhibit was not large and the quality was fair. One of the pullets was somewhat overdone, that is to say, she was too fat and what cattle men would call "patchy."

The Brahmas were of fair quality. It appears to me that we have not as yet had a good exhibit of Brahmas. They lack meat.

The exhibit of Cochins was only an apology. There were only a few pairs shown, and if one was to judge the market quality of Cochins by the exhibit made, he would be forced to the conclusion that they did not amount to much. They were fairly well fattened and moderately well dressed, but this is about all.

Minorcas and Andalusians: The exhibit in this class was fairly large. I have seen some fairly respectable dressed Minorcas, but this exhibit was perhaps of average quality as compared with what has been shown here in previous years. From a consumer's standpoint, they look pretty blue.

The exhibit of Leghorns was fair. First and second prize birds were of very good quality for Leghorns.

The class of Dorkings show a great improvement from year to year. There were some very nice birds shown. There was one pair, a good one, which had the appearance of being scalded, which, of course, threw them out of competition. Had these been dry plucked and nicely shaped, they were a pair of chickens deserving of special mention. The winners in the Dorking class were a good representation of the breed and made a very nice showing.

The French classes, i.e., Houdans, etc., were not out in large numbers and the birds were not matched, that is to say, there was a big one and a little one. The exhibitors in this class want to be a little more careful in dressing. There were some fairly nice chickens, but they were partially skinned through rough handling.

The Game classes were better this year than last. There were six nice Pit games shown. We got here an exceptional development of breast meat. The breast bone lacks in length. Had these chickens been better fed they would have made a better exhibit. The exhibit of games was an improvement over other years.

Orpingtons: The Orpingtons, as a class, have exceptional quality, but they have, to my mind, this weakness, that they appear rough and coarse, and there is undoubtedly a lack of meat covering on the breast bone. The competition in this class was fairly keen and where one won over another it was mostly on the amount of meat which covered the breast bones. There was a pair of pullets that were somewhat overdone—one had the appearance of having laid, and would therefore be considered a fowl.

Hamburgs: The Hamburgs were better this year than usual. When Wm. McNeill of London shows we generally see something pretty nice. He had a very nice exhibit this year, as did also Scanlon Bros. The difference in the two exhibits was about this. Scanlon Bros., were fatter on the back, but they lacked meat on the breast. Mr. McNeil's were excellent in breast development. I think the exhibits of dressed poultry that are bled have a nicer appearance than those that have pulled necks.

Turkeys: The turkey exhibit was equal to that of other years. The only improvement that I would like to see the turkey men make is in the color of the flesh. The dressed turkeys are rather yellow in color for my liking. The bulk of the prizes in this class were won by one exhibitor. Surely there are other men in the Province that have good turkeys. It almost looks as if everybody else was afraid to show.

Geese: The exhibit of geese is improving from year to year. Sometime ago Scanlon Bros., of Ennottville would win this class very easily. They won first prize this year in both white and colored birds, also the sweepstakes, but they had much closer competition than is usual. There were one or more pairs of geese, had they been as nice in color, would have been very close competitors, possibly might have beaten them out. If the exhibitors continue to improve their exhibits from year to year there is going to be something interesting in this class. The first prize birds won easily on color and on dressing.

There was probably closer competition in ducks than in any other class in the Show although the bulk of the prizes went to one man in both white and colored. This exhibitor had a show in itself. He seems to have the happy faculty of being able to get ducks of large size, well fatted with nice color and in addition to this he knows how to put them up to look nice. Judging from the conversation that I had with other exhibitors, that are new in the game, he will find harder competition next year. There was a splendid exhibit of Cayuga ducks, but these ducks were not as well dressed as the winners and were very yellow in color.

FINANCIAL STATEMENT OF THE PROVINCIAL WINTER FAIR.

Year ending January 31st, 1907.

RECEIPTS.

Legislative grant	$7,230 00	
Legislative grant, Seed Department, 1905	129 00	
Prince of Wales Prize	50 00	
Gate receipts	1,952 35	
Net receipts from advertising in prize list	408 75	
Joseph O'Mara, grant special prize	25 00	
Dominion Shorthorn Breeders' Association grant	280 00	
Canadian Seed Growers' Association grant, prizes	126 00	
Canadian Ayrshire Breeders' Association grant	51 00	
Canadian Holstein-Friesian Breeders' Association grant	90 00	
Canadian Hereford Breeders' Association grant	19 00	
Dominion Swine Breeders' Association grant	200 00	
Milk sold from Dairy	85 08	
Dressed poultry sold	101 15	
Sale of swine carcasses	1,015 38	
Birds sold in selling class	120 00	
Fees	3,107 85	
Special cash poultry prizes	438 50	
Sale of catalogues	23 23	
Seed exhibit sold	12 85	
Miscellaneous	5 25	
Total		$15,470 39

EXPENDITURES.

Balance due Treasurer from previous year	$ 151 07	
Directors' expenses	223 48	
Secretary's salary	500 00	
Postage and stationery	217 00	
Advertising and printing	1,419 15	
Office help, including expenses at Show	678 62	
Telegraph, telephone, express and freight on coops	117 50	
Judges, Judges' Clerks, Ring Committees	792 85	
Lectures and public meeting	375 40	
Reporting meetings, 1905 and 1906	150 00	
City of Guelph, payment for 1906	260 00	
Lighting building	169 55	
Heating building	90 00	
Swine carcasses sold	1,015 56	
Dressed poultry sold	104 50	
Birds sold, selling class	120 00	
Police service	25 00	
Milk sold	84 59	
Prizes paid	8,006 00	
General help at Show	928 50	
Block test expenses	184 05	
Lumber, hardware and shavings	70 21	
Feed and straw	121 45	
Cartage, storage and rent of chairs	38 31	
Supplies, Poultry Department	4 00	
Alterations and repairs	97 31	
Seed grain sold	12 85	
Auditor	15 00	
Miscellaneous	3 10	
Total		$15,975 05
Balance due Treasurer		504 66

Examined and found correct,
this 19th day of February, 1907.

(Signed), J. M. Duff, Auditor.

(Signed), Arthur Johnston, President.
(Signed), A. P. Westervelt, Treasurer.

ONTARIO PROVINCIAL WINTER FAIR, 1907.

OFFICERS AND COMMITTEES.

Honorary President	F. W. Hodson, Toronto.
President	Arthur Johnston, Greenwood.
Vice-President	Lieut.-Col. R. McEwen, Byron.
Secretary-Treasurer	A. P. Westervelt, Toronto.

Committees for 1907.

Executive Committee.

Arthur Johnston, Greenwood; Lieut.-Col. R. McEwen, Byron; Wm. McNeil, London; W. W. Ballantyne, Stratford; Wm. Jones, Zenda; A. P. Westervelt, Toronto.

Committee on Cattle.

John Bright, Myrtle; A. W. Smith, Maple Lodge; J. T. Gibson, Denfield; John M. Tyson, Guelph; W. W. Ballantyne; Jas. Bowman, Guelph.

Committee on Sheep.

John Jackson, Abingdon; Jas. Tolton, Walkerton; A. W. Smith, Maple Lodge; James Millar, Guelph; Lieut.-Col. R. McEwen.

Committee on Swine.

Wm. Jones, Zenda; Prof. G. E. Day, Guelph; G. B. Hood, Guelph; R. H. Harding, Thorndale; John Barber, Guelph.

Dairy Committee.

W. W. Ballantyne, Stratford; Prof. H. H. Dean, Guelph; John Bright, Myrtle; John McKee, Norwich.

Poultry Committee.

Wm. McNeil, London; A. W. Tyson, Guelph; W. R. Graham, Guelph; R. Oke, London; J. H. Saunders, London.

Judging Competition Committee.

Prof. G. E. Day; John T. Gibson; J. E. Brethour; John Jackson; W. W. Ballantyne; Lieut-.Col. R. McEwen; H. S. Arkell.

Seed Committee.

G. A. Putnam; Prof. C. A. Zavitz, Guelph; L. H. Newman, Ottawa; John Barber; G. B. Hood.

Reception Committee.

J. P. Downey, M.P.P., Guelph; Hon. Nelson Monteith; Hon. John Dryden; Dr. J. G. Rutherford, Ottawa; A. W. Smith, Maple Lodge; President G. C. Creelman; Mayor Neustadt; A. F. H. Jones; J. M. Duff; Lieut.-Col. R. McEwen; A. W. Tyson; A. Guthrie, M.P.; J. M. Struthers.

Superintendent of Buildings: D. G. Hanmer, Mt. Vernon.

Assistant Superintendent: J. H. Saunders, London.

Committee in charge of Rings.

Cattle: A. W. Smith, John Bright, J. T. Gibson.
Sheep: Jas. Tolton, John Jackson, Lieut.-Col. R. McEwen.
Swine: Major G. B. Hood, John Barber, Wm. Jones, R. H. Harding.
Dairy: W. W. Ballantyne.
Judging Competition: Prof. G. E. Day, John T. Gibson, J. E. Brethour, John Jackson, W. W. Ballantyne, Lieut.-Col. R. McEwen, H. S. Arkell.

EASTERN ONTARIO LIVE STOCK AND POULTRY SHOW, 1907.

The dates for holding the show at Ottawa were March 4th to 8th.

The new building especially erected to accommodate this Show was ready in ample time for the opening. On the ground floor are permanent and roomy pens for swine and sheep, also an exhibit room for dressed carcasses and killing and boiler rooms. The first floor, to which the main entrance gives admission, is occupied by stalls for beef cattle with a separate room for dairy cattle, lecture room and general offices. The second floor makes a good show room for poultry and pet stock.

OFFICERS AND COMMITTEES.

List of officers for the Show held in March, 1907, was as follows:—

Honorary President......F. W. Hodson, Toronto.
President......................J. C. Smith, Hintonburg.
Vice-President..............Robert Clark, Ottawa.
Sec.-Treasurer..............A. P. Westervelt, Parliament Buildings, Toronto.

Committee of Management.

The President, Vice-President and Secretary; J. H. Grisdale, Ottawa; Jno. A. Belford, Ottawa.

Board of Directors.

The President, Vice-President; J. H. Grisdale, Ottawa; A. W. Smith, Maple Lodge; J. G. Clark, N. F. Wilson, M.P., Cumberland; R. H. Harding, Thorndale; J. M. Gardhouse, Weston; T. J. Graham, Bell's Corners; David Barr, Jr., Renfrew; Jno. A. Belford, George Higman, Ottawa; W. F. Garland, Hintonburg.

Committee on Cattle.

J. G. Clark, A. H. Foster, Twin Elm; N. F. Wilson, M.P.; Thos. McDowell, Shawville, Que.; Hon. W. C. Edwards, Rockland; A. W. Smith, T. J. Graham.

Committee on Sheep.

J. H. Grisdale, J. M. Gardhouse, R. H. Harding, R. R. Sangster, Lancaster; J. Bradley, Carsonby; Andrew Cochrane, Almonte.

Committee on Swine.

R. H. Harding, J. C. Smith, R. Clark, J. H. Grisdale, Patrick Collins, Jr., Bowesville; David Barr, Jr., W. Hurdman, Hurdman's Bridge.

Dairy Committee.

J. A. Ruddick, Ottawa; J. H. Grisdale, N. Sangster, Ormstown, Que.; W. H. McNish, Lyn.

Committee on Poultry.

J. A. Belford, F. H. Gisborne, Ottawa; G. H. Higman, F. J. Blake, Almonte; V. Fortier, Ottawa; W. F. Garland, Hintonburg.

Committee on Seeds.

Warden George Boyce, B. Rothwell, F. Bradley, J. C. Stuart, G. H. Clark, L. H. Newman.

Reception Committee.

J. C. Smith, His Worship the Mayor of Ottawa, Ald. Storey, G. H. Higman.

Poultry Superintendent: R. E. McKinstrey, Ottawa.

LECTURES ON PRACTICAL SUBJECTS DELIVERED AT THE EASTERN ONTARIO LIVE STOCK AND POULTRY SHOW, 1907.

Mr. C. C. JAMES, Deputy Minister of Agriculture for Ontario, Toronto, very acceptably acted as chairman of the meetings.

THE PROPER HOUSING OF HOGS IN WINTER.

BY J. E. BRETHOUR, BURFORD.

I would, in the first place, state that I feel the housing of pigs is a necessary evil. Perhaps that is a strong statement to make but that has been my observation. The less housing we do in the winter time the better results in my experience do we achieve. When I say this I mean where there is a large number of pigs. I am quite willing to admit that where small numbers are kept moderate housing will give good results. But where they are kept in large numbers the more they are allowed to be in the open air the better will be the results. Many of us have observed from our own experience and while going among feeders of hogs, that there are a great many crippled pigs. This trouble is largely brought about by close confinement and possibly by feeding on very rich food. If we can keep all our stock as much in the fresh air as possible we will overcome these difficulties in the winter time. I believe that the open cabin or wigwam that is being used now largely is the most satisfactory plan of keeping hogs. These buildings should be made warm but not draugthy and should be portable if possible. By having buildings under this plan the pigs are allowed freedom. They go out and in at will taking a reasonable amount of exercise. Coming in contact with the fresh air and rain and sun in the winter keeps their skin in good condition and consequently their bodies healthy. Perhaps it is well to qualify a little these general remarks by saying that with fattening pigs, the animals that are within a month or two of finishing, of course, can be fed in enclosed pens. But the remarks I have made are largely with reference to the care of growing and breeding pigs. One difficulty we all experience I think is the raising of young pigs in large numbers. This can in a measure be overcome by following the principle of keeping each sow isolated as much as possible from the large droves of pigs. Another very satisfactory system of keeping brood sows when they farrow in winter time is to put them in a stable where cattle are kept. I believe these are ideal conditions. There seems to be an air in a stable where cattle are kept which is free from dampness that we cannot get in a pig pen. Brood sows with litters should be kept as much away from the others of the herd as possible. After the pigs are weaned, when they are two or three months old, they can be turned out. I do not know that it is necessary for me to dwell on the style of pig pens but I would like to say I have had more or less experience along that line by building a large piggery myself ventilated in every way and provided with artificial heat, but if it is at all possible I would always resort to outside pens. Another plan we are following with breeding stock is that we have a building which is about thirty feet by twenty feet. It is just a shed. It has about eight feet ceiling, covered over with rough boards with a long loft filled with straw. This plan we find is very satisfactory. The pigs sleep in this place. We have about fifty, and it is dry and comfortable, the straw seems to take away the dampness. They have access to the orchard. We feed them out in the open and provide warm food, being fed this way they are forced to go out and take exercise. I do not know that it is necessary for me to make any other remarks unless some gentleman wishes to ask some questions.

Q.—What plan do you take of heating the food?

A.—We use steam for that. We do not boil any of the feed, just warm it. We find that with young pigs three to five months old the warm feed is more judicious and economical.

Q.—Would it pay the farmer who has only a few brood sows?

A.—I do not think it would pay in a small way to steam the food for two or three sows. But I would certainly do it if you had a large number.

Q.—Would you feed young pigs out of doors?

A.—Yes, anything over three months old. If all pigs were allowed to keep in the open air one or two hours every day you would have no difficulty with crippled pigs.

Q.—You spoke about keeping them in cow stables. Is that good for the cattle?

A.—I do not think it will cause any injury to the cattle. That is an ideal condition, a cow stable for a sow when she is nursing, but not having that, then the colony pens are the next best thing.

Q.—Would you feed brood sows with warm food before they farrow?

A.—Yes, we feed them right up to farrowing. If they are used to this feed it will not injure them. I do not think it is good to change from hot to cold or from cold to hot feed.

Q.—Would you let them out in cold weather?

A.—If a sow is used to running in and out when she is carrying her young and is used to the cold. I do not think it will hurt her in the least, but if they are kept in for a week or ten days before farrowing and then turned out they are very liable to be injured through the cold affecting their udders, causing blind teats. This is a very common occurrence and it is very often due to carelessness. I would strongly emphasize keeping them in the open air as much as possible. The more experience I have the more I am convinced that outdoors is the proper way to keep hogs.

Q.—Can you not feed them too heavily when they are carrying young?

A.—Yes, to an extent you can, but if sows have lots of exercise and freedom, we are not much afraid of giving them too much to eat.

Q.—It would not do if they were kept inside?

A.—No, the worst kind of result would follow, but it would depend on the food. I would not feed a strong food such as corn, although I have fed fifty brood sows this winter with corn, giving them mangels once a day and they are farrowing good litters. I believe that the loss of a great many young pigs is due to keeping them confined and giving too rich food.

Q.—You would rather feed your sows pretty well than starve them?

A.—By all means. I do not believe in starving them at all. If you can induce exercise with abundant food that is the proper principle.

Q.—Would you advise having a few sods in the house?

A.—I believe they should have access to the soil, it seems to counteract stomach derangements when they get at the soil.

Q.—Would you advise keeping sows with young stock apart?

A.—You should never keep a brood sow or a sow that has got young pigs in the same pen where other stock pigs are. It is not possible for them to raise young pigs where larger and stronger pigs are being kept. The brood sow should be isolated from the other pigs and the young pigs should have a place where they can have exercise.

Q.—Would you advise keeping a boar pig separate from all the others?

A.—Oh yes, that is absolutely essential.

Q.—How would you start feeding?

A.—For four or five days do not be anxious to give much feed, but after that give a mixture of oats and bran with small quantity of corn.

Q.—Would you not prefer middlings?

A.—No, because middlings are more or less constipating, and a sow starting to nurse tends to become constipated under any conditions. It is better to give them food that is inclined to be laxative.

Q.—Would you use barley and bran?

A.—I have seen the best results from linseed or oil cake mixed with barley and bran. It is all right for brood sows.

WM. JONES, Zenda: The question of housing hogs in winter is a very important question and one that is considerably complicated. Mr. Brethour has traversed the question considerably. A simple pen and common sense feeding is about as good a method as man can devise for the proper housing of pigs in winter time. I quite agree with him that too much confinement is about the worst way you can house swine in winter in all stages of their growth. Sows when they are young have to be treated with considerable discretion and judgment both as regards feeding and housing. A dry pen with nothing but pure atmosphere in it with plenty of good dry bedding changed quite frequently, and common sense in feeding are about all the requisites I think to make swine do well, and if they won't under these conditions, I know of no way that they would. Now a pen should be as dry as possible under all circumstances. I think a perfect pen should be made pretty well all of wood and should have as little cement and stone work about it as possible. You will get in a pen of that kind a drier and purer air than in most of the others.

Q.—Mr. Brethour spoke about a straw covering for the sow. Would it not be a first rate arrangement to have a little space filled with straw between the ceiling boards?

A.—Take an ordinary frame pen and loft filled with straw. That, I think, is as good a covering as you can have.

Q.—With some space between the ceiling boards?

A.—Yes, covered over, but if you have not got straw of course a space would certainly help it.

Q.—Would there be a better system of ventilation?

A.—Ventilation is something with regard to which we might each have a system of our own. My way is to keep all foul air out of the stable and use the windows frequently. I want to have plenty of windows and plenty of light. Want them so that I can have them out altogether if I wish. If the wind is from the north I open the windows to the south. If the wind is from the east I open the windows to the west. You will get enough air in that way.

Q.—Do you think that would be rather difficult in a closed pen?

A.—No doubt, but the ventilation is a very important part of the conditions as it is with regard to any other animal.

Q.—What objection have you to a cement floor?

A.—A cement floor is always damp and cold. I have not yet seen one in a hog pen that is not that way. I would prefer to have a board floor over cement for the pig to lie on.

Q.—Would it not be better to have it elevated?

A.—I do not think it would. An elevated sleeping pen is all right, but a wooden floor four inches out of the cement gives very good results.

Q.—Do you not think a cement floor would be all right if you used plenty of straw?

A.—It would certainly be an improvement to use plenty of straw, but I would prefer to have the straw on a wooden floor.

Q.—If you had a sleeping place built up?

A.—That is all very well in its way. A great many have it. Some would have two feet up, others four inches. They are all an improvement on sleeping on a cement floor.

Q.—I suppose no matter how much straw you used the pigs would get down to the cement?

A.—They are very liable to do so.

Q.—Would it not be possible to put a raised platform for the pigs to sleep on?

A.—A raised platform is decidedly preferable to lying on cement, but speaking for myself I do not like a raised platform. I like a platform about four inches above the cement.

Q.—If as we believe the foul air settles down to the floor, pigs lying on the floor would breathe all that?

A.—Then get them outside as quickly as possible.

Q.—We find around here where the weather is very cold that it is pretty difficult to have a building where the manure won't freeze. If it is down to freezing in the building do you think it would be best to warm the feed in a heater?

A.—I would have no objection to warming the food.

The CHAIRMAN: It struck me while Mr. Brethour and Mr Jones were speaking that a great many of the questions asked and the answers given were exactly along lines that we apply to ourselves. I do not see why we can expect any animals to thrive and do well if we deny to them the very principles that we find absolutely necessary for ourselves. Exercise, fresh air, and putting ourselves in condition. These are conditions which are absolutely necessary for the proper health of our own bodies. Somebody asked, for instance, as to the foundering of pigs. We know we ourselves become foundered if we do not have fresh air, and you cannot expect hogs to do otherwise in foul air. It seems to me that we could answer a great many of those questions in connection with cattle and swine if we would apply to them the very principles as we find so necessary in connection with our own health.

THE ADVANTAGES TO EASTERN ONTARIO FARMERS OF PRODUCING A LARGER NUMBER OF HOGS SUITABLE FOR THE EXPORT BACON TRADE.

By W. H. McNish, Lyn.

I hope that no one will object to me calling you farmers, for the farmer of Canada is the man of the hour to-day. I am a farmer myself. I have been engaged to quite an extent in raising hogs and I just propose to give you the result of my experiments and observations. When a company or a corporation are contemplating any business the first thing they do is to look about to get the natural conditions as nearly perfect as possible. Now I think here in Eastern Ontario that our conditions for the production of bacon hogs are equal to any place in Canada or in fact to any place in the world.

It is essentially a dairy country. I think that point is settled. As Mr. Daniel Derbyshire, the late president of the Dairyman's Association stated at a convention in my town of Lyn a year ago, the farmers of Eastern Ontario had come to the conclusion that it was a settled fact that dairying was a business and that they are entering on that business in earnest. Well the production of bacon and dairying are twin industries. One cannot expect to attain the highest point of success in the one without the other. The dairymen must have the hogs to turn into cash an unmarketable product in order to make it pay, while the hog raiser on the other hand must have the cheap food which is on the dairy farm in order to make his business as hog raiser a success. Therefore, I think we may assume that dairying and the production of bacon are twin industries. This being a dairy country we must raise a large number of hogs. I was looking up some figures the other day and I was much surprised to find that if you grouped the eighteen counties of the Province east of Toronto, you will find that the farmers are not actually producing one pig per cow per year. Now I think this is a most lamentable condition of affairs. I think that every farmer in the Province of Ontario should sell four pigs weighing 180 to 200 pounds for every dairy cow he keeps. I was talking to a gentleman in the village of Lyn who keeps one cow, a Jersey, and he told me that in the spring he buys a pair of pigs. He turns them off in the fall and in the fall he buys another pair of pigs and turns them off in the spring; and by supplying the skim milk and buttermilk and offal from the kitchen he has two of those pigs for clear profit. I have done a little experimenting myself and I think the result of the experimenting that I have done corroborates some of the statements on the chart there. A little over a year ago I was feeding at one time 115 pigs. They were probably not under the best conditions. I had them all in one pen, and they did not have the fresh air that Mr. Brethour has recommended, but from the third day of January to the third day of February I produced pork in that pen. My pigs were probably an average lot weighing from 40 to 170 pounds and I produced pigs right in the dead of winter for two and three-quarter cents per pound for the amount of meal used, and in addition to that they had about as nearly as I can reckon, from ten to twelve pounds of skimmed milk a day. There is a chance to figure up what skimmed milk is worth. You might also figure what whey is worth. It is a very hard thing to get at the value of either whey or milk on a dairy farm. But it is my opinion that the farmers of Eastern Ontario, where we cannot hope to do anything else but dairying, should go more largely into the raising of bacon hogs. I think the farmer who has a hundred acres should turn out at least 100 pigs a year. There is nothing that he could go on with that will employ him so profitably, especially in the winter time, as keeping a good bunch of good pigs. They can do it profitably. In Essex, Kent and some of the other counties in western Ontario they are keeping four times the number of pigs per cow that we are here in Eastern Ontario. They must be doing it profitably or they would not be doing it at all. Now we here, with the advantage of having a good supply of milk and whey, certainly can produce pigs just as cheaply if not more cheaply than they can. We have here in eastern Ontario in round numbers about half a million dairy cows turning off a little less than half a million bacon hogs. Now, if we were doing as we should and could do, we would be turning off two million, and at present prices see what a handsome revenue would come into this country. The whole province is producing to-day just about one pig per dairy cow, and if we can take the whole province and produce four pigs per dairy cow, we would have a revenue at present prices of between fifty and sixty millions from hog productions. There is no danger of glutting the market. The market seems to be getting firmer. The Americans are gradually slipping out and we should be ready to take their trade up and send over to the old country the pigs that they are sending at the present time. I think that farmers and packers should get closer together. Their interests are identically the same. There should be no hard feelings. What is for the packers' interest should be for the farmers' interest. Probably we are both to blame. The packers do not come in touch with the farmer himself. I understand that the price of hogs to-day is just a shade above the export price but whether they are exporting there is certainly a great difference in the class of hogs offered and if the farmers are going to produce the kind of pigs that are wanted for the export trade the packers will have to make up their minds that they will have to discriminate in favor of just what is needed. If one man saw that his neighbor was getting half a dollar or one dollar more per hundred for his pork he would produce the quality his neighbor was producing. If by some means or other we could get packers and producers a little closed together, get them to recognize that their interests are identically the same I do not think anything would stimulate the farmers more to produce more hogs of the right sort in this part of the country. I think the farmers in this district should wake up and produce more pigs than they are doing at the present time. I do not think there is any branch of farming that is more profitable, as it is my experience that there is a profit of from twenty-five to thirty-five per cent. on every one of those pigs that is turned off. I do not think it is so much information that we need, it is a little more enthusiasm, and I think we should get a little more enthusiastic and do a little better in the future.

The CHAIRMAN (Mr. C. C. James): Mr. McNish has referred to a point that has often come up for discussion—the relation of the bacon industry to dairying. Most people are of the opinion that dairying and bacon production go hand in hand in these provinces, and yet that is not only wide of the mark but in many counties the very opposite is the case. The greatest dairying sections are producing the least amount of pork and bacon. The largest bacon and pork producing sections are those in which there is practically no dairying carried on. Take the counties of Essex and Kent, the greatest hog producers in Ontario, and they do very little in the way of producing butter and cheese. These two counties are our greatest corn producing counties. Why should not dairying and bacon production go hand in hand? The only explanation I can suggest is that the farmers have been making so much money out of the production of cheese that they seem to be perfectly satisfied. It seems to me that here in Eastern Ontario there is the possibility to add four or five, or perhaps ten million dollars, to the farmers' receipts through the addition of bacon and pork to the production of cheese and butter. It remains with the farmers of Eastern Ontario to show whether they are going to take that up or not. A large quantity of pork is produced in Eastern Ontario, and but a limited quantity of bacon. The packers of Montreal say that the fat hogs from the west are brought to the Montreal packing houses, and that there is in this section only a limited demand for fat hogs. There is no export trade in fat pork, but there is a limited home demand, and they have not only what is already produced in Eastern Ontario but the surplus from Essex and Kent. But they tell us they have reached the limit and that while up to the present a few pork producers in Eastern Ontario and in Essex and Kent have been getting a fair price, if the market is very materially increased over what we have at the present time prices must necessarily go down. We have, however, a home market and a foreign market for bacon, an expanding market, and if there is to be any development it must be in the direction of bacon. We have discussed this in the Department for two years, and it has been decided to take action. The Live Stock Branch of the Ontario Department of Agriculture and the Montreal Packers will co-operate. Beginning about the middle of April this year there will be instituted throughout Eastern Ontario a series of bacon hog sales, and we hope that the dairy farmers will co-operate with us in making these sales a great success. There will first be held a series of meetings throughout Eastern Ontario. They will be extensively advertised, and at the sales to follow nothing but first class bacon hogs will be offered. You will have an opportunity of purchasing by auction first class bacon hogs of a well selected type, to be used as a basis of improving and increasing the bacon production of Eastern Ontario. The Department is going as far as it deems wise to go in the matter. There is a great field of development here, and we hope that when this discussion comes up again a year from now in connection with this Winter Fair a great deal more interest will be shown by the farmers of Eastern Ontario in this question, and that we shall have reports of very material increase in this industry. It is one of the great undeveloped industries in Eastern Ontario. You have here ideal conditions for combining cheese and pork and bacon.

CONDITIONS OF THE TRADE IN AGRICULTURAL SEEDS.

By G. H. Clark, Seed Commissioner, Ottawa.

Allow me first to say that the farmers of Eastern Ontario should be grateful to the taxpayers of the city of Ottawa for this splendid building. We should admit that the Ottawa city fathers have had a good deal of pluck to tackle a third building, after the first two had gone down with the falling sickness. The total expense has been considerable, and we may reasonably ask ourselves wherein the city expects to get a return for the money invested in these buildings. I have been associated with farmers nearly all my life—a farmer myself— and, although I am not very old, I have also had something to do with business men who know very little about farming. I have found among the latter perhaps a larger proportion of broad-minded men than we find in our best communities of farmers—men who can anticipate and estimate the benefit of such an institution as this to the farmers of the surrounding district. In erecting these buildings the people of Ottawa did not expect to get immediate return. They knew that the future of Ottawa will depend—the future of any city in Canada will depend, this being an agricultural country—very largely on the boy on the farm to-day, who will be the planner and pusher in the farm work of to-morrow. The greatest asset of this country is the lad on the farm who will be responsible for its management a few years hence. That asset may be increased or depreciated by the intelligence which the boy will be able to apply to farm work.

This Eastern Ontario Live Stock and Poultry Show is an educational institution. I have heard complaints this afternoon and evening that the show is poorly attended. I venture to say that in two or three years you will see this hall, at every session held during the show, crowded with farmers eager to get information. The people of Ottawa and of Eastern Ontario have no reason to be discouraged because of the small attendance during the first few years.

I am glad that there is a seed department in connection with the winter fair. It seems to me that the fair would not quite fill its purpose unless field agriculture were represented, and field agriculture is best represented in the exhibits in the seed department.

YIELDS OF FARM CROPS. When we consider the farm crops of Canada as a whole, and the average yield obtained, we cannot but conclude that those yields are considerably lower than they should be. Take oats, for instance, one of the main crops of Ontario and of Canada. We find in British Columbia that the average yield is 42½ bushels per acre, in the three western provinces about 35 bushels per acre, in Ontario 32½, Quebec 25, in the Provinces of Nova Scotia and New Brunswick 25¾, and in Prince Edward Island a little more. In Ontario we have large areas of oats that yield over 60 bushels to the acre; it follows that other large areas come considerably below the average. The question is, What is the cause of these low yields? The quality of the seed has, I think, much influence, but that is only one consideration. I venture to say that the main cause is found in bad methods of farming.

WEED SEEDS IN THE SOIL. The noxious weed growth is one of the most serious problems that the Canadian farmer has to contend with. During last summer we collected, in the Department with which I am connected, some twenty-nine samples of soil, mainly from Manitoba, taken from different depths, in order to ascertain the proportion of weed seeds. We found that the number ranged from 200 to 35,000 per cubic foot, sufficient to provide a luxuriant crop of their kind for fifteen years to come. How many farmers stop to consider, when they are busy with their hay or their harvest crops, that the weeds are going to seed most profusely? How many consider the supply of weed seeds they allow to go into the soil? Farmers would do better to look to this than to almost any other problem that they are tackling in field agriculture to-day.

SEED GRAIN: A very small proportion of that which is used in the Province of Ontario—not more than 5 per cent.—is handled by the middleman, the man engaged in the seed trade. The bulk of the seed is used on the farms where it is grown, and considerably more than 5 per cent. is exchanged amongst the farmers themselves. Under the Seed Control Act, all that is asked of the seed merchant is that in the sale of any kind of seed grain he shall provide the farmer, or other prospective purchaser, with information as to the noxious impurities in the grain. The farmer should thus be enabled to buy intelligently. If the seed vendor is offering for sale seed oats containing wild oats, or some other impurity, he is required to attach a label to the package showing that the seed contains such impurity. No parliamentary enactment can be of much help to a farmer who knowingly buys such seed for his own use.

GRASS AND CLOVER SEEDS. The matter of grass and clover seeds is one of the larger problems we have in connection with the control of the seed trade. Ninety-five per cent.—I think I may say even more—of the grass and clover seeds used in Canada are either timothy, red clover or alsike. Some alfalfa is grown in Ontario and Alberta. Timothy seed is produced almost all over Canada, but the main supply of our home-grown seed comes from the Georgian Bay and the St. Lawrence Valley districts. The seed grown in those districts is as excellent as that produced in any country in the world, and perhaps that accounts for the fact that a great deal of it is exported to Europe, where it sells at fancy prices. Illinois, Minnesota, Iowa, and Wisconsin have large areas devoted to timothy seed, and that which comes to us from those districts is fairly clean, but not so 'bold'' as the home-grown seed. When used in the Georgian Bay or St. Lawrence Valley districts it produces a crop of timothy seed as good as any produced in Canada. Not many years since farmers in Western Ontario would save timothy seed from crops of fall wheat grown after timothy sod. Such seed, screened from fall wheat, usually contain an abaundance of weed seeds, but during the last two or three years there has been little of that quality put on the market.

Red Clover and Alsike. Of the farm crops, red clover and alsike are at once the most dangerous and the most valuable to the farmer. The Province of Ontario is a large producer of the seed of these clovers. In the average of years fully one-half of the red clover, and more than that of the alsike, seed is exported. A larger quantity of red clover than is grown in Canada, but not so much alsike, is grown across the line, in the Northern States. Europe is the natural market for Canadian grown clover seeds. The greatest central distributing point for seeds of all kinds is Hamburg, in Germany. You can buy in Hamburg to-day seeds of any kind, of the very best quality, from any point of production where they are grown, or you can get the dregs of the markets.

During the last twenty-five or thirty years guarantee systems have been evolved in Europe, some of them voluntary and some enforced, under which any farmer buying seeds can get a statement of their percentage of purity and vitality. As a result of these guarantee systems, European farmers have learned that it does not pay to buy the poorer article; they are anxious to have the best, and are willing, as a matter of good economy, to pay the best price for it. As a result of that again, we find in European markets a wide variation in prices, ranging from that of the No. 1 article to that of the dregs of the market. The No. 1 can be sold in any part of Europe, but not much of the poor seed is retailed there. The cheap seed—the cleanings from the grass and clover seed that is gathered together in the markets of Europe and is of such low quality that it cannot find a retail market under those guarantee systems—is retailed in those countries where there is no system of seed control. Until the Seed Control Act of September, 1905, came into force, a considerable quantity of such cleanings from Europe came to Canada, although perhaps a larger share went to the United States. But what seemed to me to be more serious was that the best recleaned Canadian seed was exported, while the lower qualities were largely sold in our home markets. Our farmers come to better appreciate the bad results, and were at once inclined to blame the seedsman. We have, I am glad to be able to say, among our Canadian seedsmen as honest and capable men as can be found in that business in any part of the world. They handled the seed our farmers produced and sold an article our farmers demanded—the very best or the very worst, in former years principally the lower grades, because it was cheap. A great many farmers in Ontario, Quebec, New Brunswick, Nova Scotia, and, to a lesser extent, in Prince Edward Island, demanded a cheap seed, and got it, at a low price per pound, but a very high price considering the crop. With the enforcement of the Seed Control Act, our seedsmen had to face the problem of finding a market for the lower grades, a great deal of which is still produced, and of getting supplies of the higher grades. The experience of the last two years must have been encouraging to the man who has maintained a clean farm and discouraging to the one who has tried to grow clover seed on weed-infested land. Our low grade clover seeds and cleanings have now to be exported at much reduced prices. The advisability of allowing to be exported our clover seeds that are foul with seeds of the weeds we call noxious is a mooted question. What is a noxious weed in

Canada may not be noxious in another country. No weed is legislated against so much as dodder, which is not a serious pest in Canada.

The problem of disposing of the inferior seeds now produced has to be faced. The only way permanently to overcome the difficulty is by improving the quality of the seed produced. That is a slow process, but Ontario farmers should be encouraged by the advance that already has been made. We receive at the Department many complaints that the Seed Control Act is not stringent enough, and that it is not enforced to the letter. If the men who send in those complaints would travel through Central and Western Ontario in October or November and see for themselves the quality of the seed as it comes from the clover mills in operation in farmers' barns, they would have a better appreciation of the difficulty the seed merchant has in supplying the demand for seed of first quality. The red clover crop of this year is almost a failure. I do not know, however, of any crop that pays better, taking the average of years, than red clover seed.

Imported Red Clover Seed. On account of the failure of our home-grown crop last year more than half of this year's red clover seed will have to be imported. It will come largely from Chili and Great Britain, and some from France. We have heard alarming statements during the last month about new species of weeds detected in imported clover seed. I have examined four lines of samples of red clover seed offered to our merchants by English wholesale firms, by whom it was imported from Chili. A large quantity of imported seed has also been examined in the seed laboratory, and that imported as No. 1 was really a good, high-class, clean seed. From the red clover seed now offered from abroad, our merchants have the privilege of purchasing the best or of taking, at a lower price, decidedly inferior seed. We have a great many jobbers engaged in the seed trade—merchants who do a wholesale business, but whose main business is of an entirely different character from that of seeds, and who have imported perhaps more than half of the red clover seed that has been brought in from abroad. Much of that is of a quality that will only pass the minimum standard of the Seed Control Act.

Nature of Impurities in Imported Clover Seed. The principle impurity which has alarmed seedsmen is dodder. In a country where it will thrive, it would ruin the clover crop to sow seed containing dodder. The dodder winds itself around the clover plant and feeds on it as a parasite, and will spread very rapidly and widely. But weeds noxious in other countries may not be noxious in Canada. We have been testing seed here for the last five years, and I have discussed the matter thoroughly with other botanists who have been in touch with the clover seed trade for fifteen or twenty years, and I have yet to find the man who ever saw a kernel of dodder seed in Canadian grown red clover. The species coming to Canada is a native of a warmer climate, and does not seem to thrive here. If you know what it is you need not have any serious fear of permanent injury coming from clover dodder. Many farmers will remember that about thirteen years ago buckhorn or ribgrass was introduced in the same way. Unfortunately our Canadian climate was well suited to that pest, and it has caused untold loss.

Root Crop and Garden Seeds. I will refer for a short time only to the root crop and garden vegetable seeds. All our root crop and a great many of our garden vegetable seeds are imported, some of them from England, some from France, and such as the sugar beet seed from Germany. In getting their supplies our importers have the option of buying good, selected seed from reliable European growers or of getting cheap seed from unreliable growers. Anyone who has travelled over Ontario and the other provinces as much as I have during the last four or five years, and has made careful observations of the quality of the root crops will have seen that the quality of the crops varies widely with the quality of seeds obtained from different seed houses. In getting their supplies of root crop seeds farmers have to depend on the reputation of the man from whom they buy. If you send a sample to us we can advise, after making an extensive growing test, only as to its vitality. Although varying conditions of soil and climate have to be considered, as a rule when a carrot crop contains a large proportion of plants that go to seed the first year, you can safely conclude that the seed was grown from a poor and unselected stock. In turnips, marked unevenness in type, too much fibrous roots or thick necks, denote that the seed has come from poor stock and has not had proper selection and care at the hands of a reliable seed grower. There are many responsible growers in Europe, and their reputation is the only protection that our seedsmen have to fall back on. Competition in these seeds is restricted far too much to the matter of prices; our root crops, in consequence, are not so satisfactory as they might be. From testing at the seed laboratory several hundred samples of garden seeds each year, I am often surprised at the quality, in respect to vitality, of the seeds put on the market by some firms. The farmer or gardener should get from his seedsman a statement showing the percentage of vitality of his root crop and garden seeds. Seedsmen who deal in large quantities of onion or parsnip seed and who have a lot left over at the end of the season are not likely to destroy them. Such seeds, unless they are fresh, are practically useless except to increase the bulk. Farmers and gardeners should know the proportion of the seed that will grow. Those who buy and use seed without knowing its percentage of vitality take a good deal of risk.

The Chairman said that he did not know when he had listened to an address which had broken into so much new ground as had that which Mr. Clark had given. He was glad to see this subject added to the winter fair programme, and hoped that it would increase under Mr. Clark's efforts. Seed control is one of the basic things in agriculture. The question had come up several times in the Ontario Legislature, and it had been pointed out, as Mr. Clark had said, that the only thing people can do is to rely on the reputation of the man from whom they buy seed. It always came back to that one point, that they could not make the seed merchant directly responsible. He had wondered whether, in the case of the importation of seeds, it would be fair to limit that. Now, Mr. Clark had told them that reliable merchants are importing pure seeds, but that others are bringing the dregs of the markets, the question was, whether they would be warranted in controlling the men who import seeds.

Mr. Clark said that the wholesale merchants of Canada have spent a good deal on their cleaning plants. There are cleaning stations at Toronto, Hamilton, London, Montreal, Oakwood, Quebec, and other points. The merchants want the privilege of importing for recleaning seeds of questionable quality. They have always had that privilege. He thought that for the next few years the safest way to control that seed is when it is offered in the retail market. There are many objectionable features, both from the business man's and from the farmer's point of view, in the restriction of seed importation. The sale of low grade seed should be prevented, but until the supply of home-grown seed had improved he did not think it would be beneficial to restrict the importation of seed.

The Chairman remarked that he was not sure they would meet with great success in enforcing this Act. Perhaps the trouble is that the Canadians are a very independent people. They seriously object to interference; they will oppose any attempt to enforce an act which seems to interfere with trade. One had only to go to Europe to see a wonderfully different state of affairs. There the people have been accustomed to submit to Government regulation which in Canada would be regarded as interference. The commission appointed last year to investigate the horse industry was an example. People thought that information was being gathered to serve as the basis for regulations for the restriction of the service of stallions, which would put some people out of business. Of course, no such instructions were given. However, the day will come when they will have to submit to the rule of the majority, and he wondered if Mr. Clark thought they were sufficiently advanced to limit the importation of seeds to certain persons.

GLEANINGS FROM FIELD WORK IN ONTARIO DURING THE PAST SUMMER.

By T. G. Raynor, Seed Branch, Department of Agriculture, Ottawa.

I am sure it is a privilege as well as a pleasure to be present on this occasion to talk to you on what I consider to be a very important matter. Our worthy chief referring to me said that part of my business as an inspector was to see that the farmers got good pure seed. Now I want to say just a word on this point and it is this, that there has been an educational process going forward in this country along this line and there is an increasing class of farmers in this country who are asking for a number one grade of seed. I found last spring that those dealers who had dealt in these first grade seeds were sold out of them first. Now the question that I am to introduce to-night is along the line of the work in connection with our seed branch.

The Seed Branch stands for three or four things. It stands for the production of high class seeds, the eradication of noxious weeds and the best methods of tilling the land so that we can get the best result when we get the good pure seed. In the report of the Bureau of Industries the Chairman tells us there are about five million acres devoted to field crops such as barley, oats, peas and the cereals excepting corn. Approximately we have between nine and ten millions of acres under the plow in this good old Province of Ontario and we are producing a very large amount of grain from year to year. Our stockmen are certainly interested in this question. There is no farmer in the province who should not be interested in the production of high class seed. I find in my experience as a farmer that high grade seed is good seed and cheap at any price and low grade seed is poor seed and dear at any price. Now we want to grow a high class quality of seed and we want to know that we can expect the maximum results from that seed. Take a kernel of corn for instance and you may know that hidden in that seed is a little plant that is going to start a new life out of the forces stored up in it. We call that the germ.

By the means of diagrams Mr. Raynor here explained the scheme of Dr. Robertson, Principal of the Macdonald Agricultural College, for improving seed. The method of selection practiced by the Members of the Canadian Seed Growers' Association is to start from the original crop by selecting a sufficient number of the best plants which when thrashed will sow a breeding plot of at least a quarter of an acre. This seed should be given a clean, fine seed bed, the following year, and when ripe, just before harvest, a sufficient number of the best plants should be selected to sow the breeding plot of the following year. This is done for three years when the result of the breeding plot will produce seed that will register. A member of the Association could gain two years by buying registered general crop seed of some member who had been doing this work for five years.

Proceeding Mr. Raynor said: All things being equal a seed which is large and plump and has stored up a large food supply, will have a good chance to start in life and that is why we stand up for good seed. There is scarcely a farmer we find in the province but who believes that any variety of crop he is growing will run out, and he says, "I must change my seed" in order to keep up the yield per acre. Then he reads up the seed catalogue and he finds a high priced grain and because it is high priced he thinks it is a panacea for all the farmers ills. So he buys some of that seed, or perhaps he has been to his neighbors and he has learned that a certain variety of seed is yielding better than his own. He makes an arrangement that he shall have a certain amount of that seed. Sometimes he brings it from a heavy soil to his light soil, or from a light soil to a heavy soil, thinking the change of soils has something to do with it. I do not think that as much credit should be given to that system as is given to it for I find out that if I go to my neighbor to get seed grain I never think of giving that seed the worst place on the farm. If there is a good place it will be there that I will put that seed. So I suit the environment, I give the very best soil condition and I get all the forces of nature to help to produce a good crop in the importation or the bringing in of that variety and when I compare that with other varieties produced on my farm I naturally say it has come from the exchange of seed, while it has largely been a case of environment and the better condition of the soil. Now another thing I wish to take up in seed selection is the use of the fanning mill. I am in favor of the fanning mill. I fear it is not going to be used as much as in the past, but what we want to do is to see that it shall be used a good deal more. My contention is that all our seed grain should pass through the fanning mill frequently enough to fan out all the light stuff and screen out all the small seeds. That will require it to be put through the mill perhaps three times and when we have got four bushels reduced to three bushels as it comes from the bin we can say the fanning mill has done its duty in bringing out the best seeds. The fanning mill can never distinguish between the large plump seeds which come from large heads and the large plump seeds which come from small heads. You know very well the laws that were in operation in improving the stock in connection with this cattle exhibit the very same laws that have been in operation for grading up our herds and flocks may be applied to improving our seed grain. If large plump seeds come from a large plump head the fanning mill cannot distinguish between them and those which come from small heads. We think we have a little better system than that. There are some men willing to stand up and say they are not afraid to sow small plump seed, and that the result has been satisfactory. This may be true occasionally. I believe, Mr. Chairman, that a great deal of money could be made on Ontario farms by a better fanning mill system of selection than is adopted at the present time. If we can increase the yield per acre five bushels by an improved fanning mill system of selection I believe we can increase it another five by the system of selection I am going to introduce to you.

As to the organization of the Canadian Seed Growers' Association. How many farmers are there who practice this plan, that when they are cutting their grain they will save by itself for seeding purposes that which has grown on the highest ground and has fully matured at the time of cutting. There are a few farmers that do that. The majority of the farmers will go direct to bin and take seed which has not thoroughly matured. We find a certain number of men who do not appreciate the treating of their seed with solutions that kill the smut. I do not believe that farmers are waking up to the importance of this matter as they should.

The selection of the seed from a breeding plot is similar to the selection of the pure bred sire, in producing good stock, and the breeding plot in grain is calculated to take the place of the pure bred sire. Supposing you appreciate the system like that adopted by the Association referred to you can save two years in the operation of getting the seed registered by buying from some man who has been doing this work for five years and who has produced registered seed. Are these points worthy of consideration? I am sure the Association is doing good work and the lessons the people of Ontario are learning is telling.

Replying to a question from the Chairman the lecturer said,—The man who is improving his stock tries to get the ideal animal photographed in his mind. In the improvement of our grain, I think we should have an ideal grain in mind as far as we can get it and improve to that ideal, and of course we can only do that by selecting seed from the best plants.

Q.—Have you done anything in the way of vegetable seeds?

Mr. Raynor: Only in the way of potatoes and tomatoes. Mr. Robertson of St. Catharines, Ontario has been experimenting in regard to tomatoes and he is getting an earlier tomato and one of better color and size than the original and that was what he was aiming at.

Q.—It takes three years to produce seed which will register?

A.—Yes.

Q.—Well, is it not better for us to get the registered seed?

A.—Yes, it certainly is. You get two years advantage.

Q.—I do not ask that for my information but so that the gentlemen should know it.

A.—It is a good point. Here a man may have a good variety of wheat, or oats, or barley and he knows what it is producing on his soil.

Mr. Raynor here exhibited a specimen of Reid's Improved Dent Corn grown in Essex. It was a very creditable ear to grow anywhere, and he said it was the result of selection.

The seed exhibited at this show I do not think is as large or as creditable as it should be for Eastern Ontario. The keenest competition was in oats, but in other lines there was not as great a competition, but I want to congratulate those who did exhibit on the quality of their exhibits for they cleaned it up well. One of the main things in reference to the breeding crop system is that we are able to choose our mother ears from the most productive ears.

The Chairman: We have not the history of each individual ear.

Mr. Newman: Only for the last two years. It is possible that each different ear comes from a different father. That would represent a different capacity in the yields. We know that there is a great variation in the yield.

Q.—Do most of the farmers try to grow ensilage corn?

Mr. Newman: Yes, they try to get large corn and which is perhaps full of water. I think people have made a mistake in regard to ensilage corn. I think if you get more solid food in the way of more dry matter and more grain you will get something that is going to give more milk per cow than the other.

What we are trying to do along the Lake Erie Counties is we are trying to get an ear which will yield more shelled corn. At the present time seedsmen are getting their seed from the United States.

Q.—What kind of land do you find best adapted for corn?

Mr. **Newman**: Well, you expect a light soil. Corn is a heat loving plant and you have got to take in as much heat as quickly as possible and shove it along.

THE FARMER'S FLOCK OF SHEEP.

By G. E. Day, Professor of Agriculture, O.A.C., Guelph.

As I understand it, the object in placing this subject on the program is not to urge every man to keep sheep, but rather to present to the public some of the claims of the sheep to popularity, in the hope that it may bring about a discussion which may be beneficial. I do not think it would be wise for every man to keep sheep, for the reason that in order to be successful with any class of animals, a man must have a love for them, and if a man does not like sheep, he would not be likely to make a success of them. There are several things about the sheep, however, which make them especially well adapted to occupy a place on almost any farm, and I shall attempt to place these points before you as briefly as possible.

(1) Sheep will eat a great many kinds of weeds which other animals will not touch. This makes them especially valuable about a farm as a sort of scavenger.

(2) They will live on very poor pastures where many other animals would starve. Their activity enables them to travel long distances in search of their food, and the formation of their mouth is such that they can bite very closely to the ground, enabling them to gather a living from the poorest soils.

(3) Sheep require very inexpensive buildings. Almost any sort of building will answer the purpose so long as it protects them from storms in the roughest weather, and is reasonably dry and free from draughts. There is no farm animal for which cheaper buildings are required.

(4) There is comparatively little labor involved in taking care of a flock of sheep. I do not know of any animal that requires less labor in its feeding and management.

(5) They grind their own grain, which is another factor which adds to the cheapness of their maintenance. They are the best grain grinders which we have, and the weed seeds consumed by sheep are never known to grow afterwards. This is not true of other farm animals.

(6) They are economical producers of meat. There has been a good deal of experimental work in connection with this matter, and it is generally estimated that to produce a pound of increase in weight a sheep requires from 8 to 9 pounds of dry matter in its food, whereas a steer requires some 12 to 14 pounds of dry matter. This shows that the sheep is a very much more economical producer of meat than the steer, and it also compares favorably with the pig, especially during its early period of growth.

(7) The sheep gives two products in a year, namely, wool and lambs, both of which have a ready market.

(8) While it is true that sheep are more liable to sudden death than some other farm animals, at the same time, the amount of capital invested in a sheep is small and losses of this kind are not serious losses after all.

But while the sheep has so many things to commend it, I do not think it would be wise for the average farmer to stock his farm heavily with sheep, neither do I think it wise for him to go to the other extreme and dispense with sheep altogether. The sheep is eminently well adapted to fill in a peculiar place on the farm, making an economical use of products which would otherwise be wasted, and constituting what might be called an important side issue in the business of farming. The cost of maintaining a small flock of sheep is comparatively trifling and the returns they make add materially to the revenue of the farm.

The trouble with many of us is that if we cannot go into something on a large scale, we do not wish to touch it at all, and I believe that in many cases if we had fewer sheep, fewer hens, and fewer hogs and had them looked after better, it would be to our advantage. There is no reason why the sheep should not be increasing the revenue from many of the farms of this Province where at present no sheep are to be found and we believe that the farmer will find the sheep one of his best friends if reasonable intelligence is used in its management.

Q.—What kind of fence would you recommend?

A.—A woven fence.

A MEMBER: I was driven out of the sheep business by dogs.

ANOTHER MEMBER: I believe that in the eastern part of the Province we are infested with a weed that would not exist if we kept more sheep, that is the sow thistle.

Q.—What breed of sheep would you recommend for the average farmer?

A.—In this room there are men who are breeding Shropshires, Southdowns, Lincolns, Dorset Horns, and probably a number of other breeds, and each man feels sure that he has a good breed for his purpose. It is impossible, therefore, to recommend especially any one breed of sheep, because all our improved breeds will give good satisfaction if properly handled. Each man has his likes and dislikes in the matter of sheep as in everything else, and possibly one man may find a certain breed will do better under his conditions than another breed, but it is simply impossible to make general recommendations as to what breed should be taken up.

Mr. JOHN JACKSON: I was just going to make one remark in regard to the care of sheep. In a good suitable building, I would rather take care of one hundred sheep than one dairy cow.

Q.—Have you had any experience in regard to different kinds of soil for sheep?

A.—No, I cannot say that we have, although, of course, we like to keep the sheep on the highest and driest land which we have.

A MEMBER: In some parts of the country where the land is sandy, farmers had to quit raising sheep because they could not keep a ewe more than three or four years. Their experience was that the sheep ate too much sand when they were eating the grass.

THE PRESENT CONDITION OF THE SHEEP INDUSTRY AND PROSPECTS FOR THE FUTURE.

By Robert Miller, Stouffville.

I believe this is the third or fourth time I have spoken on a subject of this kind at your winter fair. I dare say different people may wonder that I should get these repeated invitations to come down here because it seems to me a simple matter to talk on the subject of sheep breeding. It always seems something commonplace when I enter into it and I do enter into it every day of my life even when I do not stand before an audience and address them. But there are a great many phases of this question. You notice from the speeches how many branches that sheep are connected with on the farm. One man says they take up the weeds and the seeds that fall from the weeds never grow any more. Another man tells you he has got to get particular fencing. Another man tells you about the dogs, whilst another man tells about the sand. Gentlemen, we will find little difficulties like this cropping up no matter what business we embark in. But I can tell you if it were not a fact that there are less disadvantages and more advantages in the breeding and growing of sheep I would not be connected with it. I have had experience in horse breeding. I was brought up on a farm where there was a large amount of cattle breeding. If I wished to select the cattle breeding and importing for my chief industry I could do it. But I can tell you that in the face of all the advantages that do exist in connection with the importing of good cattle and good horses, I have selected as my choice and my chief business the importing of sheep and distributing them through Canada and the United States, and this notwithstanding all the difficulties we encounter. It is no use for any man to profess to be interested in sheep breeding if he is not ready to keep his sheep in his fields. We must not be too ready to blame our neighbors for the difficulties on our farm. I can tell the gentleman who spoke of wire fences (barbed wire fences) that they are considered a back number in my own part of the country. In all parts of America they are using woven wire instead of the barbed wire. I believe that that should not be considered as an outstanding difficulty to be met with if we are to go into the industry of rearing sheep. Another difficulty is the dog nuisance. I believe that sheep are of more importance to the people of this country than dogs are (hear hear). I like dogs as well as anybody else, but I do not claim for them any privilege on my neighbour's farm. If we had as strict laws in regard to our dogs as we have in regard to our sheep, we would have the the same privilege as the dog men. Now the question arises as to whether it would be profitable for all men to keep sheep or not. I do not believe it would. I believe in the case of a man who dislikes them, it would not be a wise thing for him to invest in sheep because I do not believe he would do well with them. If a man dislikes them they never will do well. There has to be a sympathy for the sheep. There are a great many farms in this country and more especially in this part of the province where it would not be well to stock your farms heavily with sheep. I believe, however, a few sheep would do well on any farm. Some farms will take a large number of sheep and some will do otherwise. I was born and raised in the township of Pickering. We could not keep a very large number of sheep on our land for the reason that there was a stiff clay sub-soil. Another neighbour kept a large number. That shows that the land must be well adapted for his sheep and that is an important thing. We can scarcely speak of the sheep industry with attaching to it a certain amount of discussion in regard to the sheep industry of the United States. In the United States perhaps twenty-five per cent. of the men who claim to be lovers of sheep go out of the business every year, and they do it because their flocks have become unthrifty. Their flocks have become unthrifty because they do not take care of them. We find year after year men coming over for from fifty to one hundred and two hundred to five hundred and I can tell you that I have sold 2,000 rams to two men in three days. These rams have to be supplied, and these men knowing the good character of the sheep sold here will come from the States to this country and will pay us well rather than buy them in the States. This shows we have splendid chances in regard to sheep breeding. We go to Mexico. We know the people of Mexico would rather deal with us than with the people of the States because of the war that took place between Spain and the United States. Some of the best customers we have in this country live in that great Republic of Mexico. There is perhaps a greater opening there than in any other part of the world. That shows you what great advantage it is to keep a good clean bill of health in this country and try and supply unlimited numbers because there would be unlimited numbers as far as our resources are concerned. It is not a month ago that I refused two orders for yearling rams simply because we could not get them here in Canada.

Mutton is a more healthful food than beef is. There is just something in connection with this that everybody ought to learn, mutton or lamb in this country has never had the chance it should have in being compared with other kinds of food. There are very few people who know how to dress a lamb. No meat ought to be eaten until it has been thoroughly matured on the hooks, but it is most important that mutton should be matured before it is eaten. Now, Gentlemen, I am afraid I have touched very lightly on my subject proper—the present condition of the sheep industry in this country. There are very few of the improved or pure breeders that have any sheep for sale. You will know that is a fact when I say I refused not long ago orders because I could not get the animals. I have sold twenty-five thousand dollars worth of sheep to one man the past year.

The CHAIRMAN: Where did these sheep go?

Mr. MILLER: They all went to the States and they were distributed all over by him. I do not know that I have ever had greater faith in the sheep industry than I have to-day. Mutton and lamb have apparently obtained a sterling value in the States such as they have had for a very long time in Great Britain. I have many a time seen when people in England did not know whether their beef cattle would pay them or not, but I cannot remember a time when they did not know that their yearlings and lambs were going to pay them. Now gentlemen, I just thought a little illustration or two with regard to every man keeping sheep with advantage might be interesting. Speaking of horse breeders, I think perhaps no man on the face of the earth to-day has been more successful as a horse breeder than Andrew Montgomery. He breeds quite a number of sheep every year. He told me the sheep that he raises pay him as well as the horses that he breeds. I could give a great many illustrations. W. S. Marr told me that the sheep he breeds paid him as well as his Shorthorns. Here were men that believe in mixed farming, and they would not be induced to leave out the particular branch (the sheep) which I believe the most successful branch of mixed farming. There is just one little point concerning what Professor Day told you. He said sheep needed less care than other animals. Now I believe there may be a wrong meaning take out of that. I believe sheep do not require as much care as other animals, but they do require some care. I do not think it would be right and it is a mistake to put a few sheep in a field and put a fence around them and then think you have made provision for them for six months. That is altogether a mistake. I do not believe that is the proper way. You want to think of your sheep and if you can give them a little change of food I can tell you they will pay you well for your attention.

Replying to a question, Mr. Miller said: I think if a man keeps a large number of sheep it would not be well to let them run with cattle. If you have a small flock of sheep it will not do your cattle any harm. As to the question of breeds. If a man likes Shropshires, or any other breed let him keep them.

Q.—Would you cross a Leicester ram with a Shropshire ewe?

A.—I think if a man is going to breed sheep for feeding purposes it is a very good thing for him to cross. I would, however, rather cross them the other way. I would rather cross the Leicester ewes with a Shropshire ram.

A **Member**: In regard to the dog question, my idea would be to compel the people to tie up their dogs and let it be understood that that dog must abide by the law.

Another Member: I think it will be a good thing when the law is reconstructed so that there is a heavy penalty for dogs being allowed to run loose in this way.

Mr. **Miller**: I take the view that every man should be forced to look after his dogs.

A **Member**: I think a dog is more protected than the sheep in some parts of the country. I knew the case of a man whose dog had done damage to his neighbour's flock. He went to the owner and said what is the amount of the damage? He replied so many dollars and so many cents and was paid. Then he said now I have paid you for your sheep I want pay for my dog which you killed.

The **Chairman**: A few years ago, I knew a man and I never saw one so enthusiastic about sheep breeding as he was. He said "You have got an ideal country for the breeding of sheep; you have got good grass, good clear air, and good clear water, and whenever you have these combinations you have the ideal conditions for growing not only good horses and good cattle, but good sheep." Now as to the question of future prices. Mr. Miller did not venture on any prophesy in regard to that. I think we are just entering upon an era of good prices. The prospect is that high prices will continue for sheep and the farmer is the one who will benefit by this.

JUDGING MUTTON SHEEP.

By John Jackson, Abingdon.

To illustrate his points the lecturer had before the audience one of the prize sheep taken from the show and which he considered a good all round specimen. He said; "I am in a way pleased that so much has been said about sheep for there will be less for me to say as to the judging of sheep. There are a number of difficulties in the way in this matter. One difficulty is the covering with wool, and therefore, you have got to have experience how to handle them and understand whether they've been manipulated with the shears, to find out whether the sheep is as straight and level as he looks, or not. The shepherds have their "fine art" down fine, cutting down the high places, this will deceive the eye, but not the hand of the experienced judge.

We know we have very much better judges of sheep now than we had a few years ago, I remember when a good judge of sheep was a very rare thing; in fact, they are not too common to-day.

To come to the point of judging sheep, the subject before us. I think it a good idea if you have a good row of sheep to judge to first walk around them, viewing them from in front and behind, see that they stand well on their legs and pasterns, then go over them selecting out the best by themselves till you have one or two more than you have prizes for, look for the poorest in this lot, then go over them once more to see if you have left one as good or better behind, then confine your work to a thorough examination of this lot. It is better to do this in a systematic way, say beginning at the head." Mr. Jackson then took the sheep before him and explained the various points. He said it was necessary to have a clean cut head, wide between the eyes, open nostrils, ears and covering according to the breed represented. If a ram he should by all means show a strong masculine character, neck strong, tapering from head to shoulders where it should join smoothly. The neck veins should be strong, shoulders should be well packed up, not loose and open as if stuck on outside the body, should be wide in the breast, deep and wide through the heart girth, back broad and level well covered with firm flesh or muscle, well sprung deep ribs, broad strong loin, well let down at flanks. The body as viewed from behind should be broad and deep like this sheep that we have before us.

The leg of mutton and the back are the most valuable parts in a sheep. Quality rather than size should be the aim of every producer of mutton sheep, no matter what breed, for that brings the highest price in the market. Ewes should show a little more of the dairy type, they will nurse their lambs better.

It requires a good deal of close attention and practical experience to become an expert judge of sheep, and every man to be a successful breeder of sheep must be something of a judge or he is liable to make serious mistakes. Proceeding, Mr. Jackson said one reason why we have better judges now than in days gone by, is the fact that we have better and more well bred sheep, more different breeds in country. Most every one has got in the way of breeding a better class of sheep.

Then there are those judging classes held through the country, and last but not least I think the short course judging classes at the O.A.C., Guelph have done very much in improving the judges of the country. It will well repay one who intends breeding sheep or any other class of stock to attend at least one of these short course classes. They take place at a time when most convenient for farmers to spare the time to attend.

METHODS OF RAISING STEERS.

By G. E. Day, Professor of Agriculture, O.A.C., Guelph.

Whether it is advisable for the people of this section to attempt raising steers for beef is a matter which they must settle for themselves. I know that the farmers here have been urged to use beef blood in their herds with the object of improving the beef qualities of their dairy herds. I certainly do not intend to advocate this system, as I am doubtful regarding the advisability of mixing beef and dairy blood. It is true that cross breeding is carried on successfully in some places, notably in Great Britain, but the work is carried on with a definite object in view and the crosses are made judiciously. In this country, I believe that the indiscriminate mixing of breeds has worked a great deal of injury to our live stock. It is my opinion that it is safer for the average farmer to stick to one breed, getting the best possible representatives of that particular breed and gradually bringing it towards perfection, whether it be for beef or for milk production. Indiscriminate cross-breeding has never been known to result in improvement.

Cheese-making, of course is very unfavorable to beef making. The two things do not harmonize, first, on account of the class of cattle used in the production of milk for cheese-making, and secondly, because the milk is sent to the cheese factory and there is very little available for calf feeding. It is almost impossible to raise steers successfully without using considerable milk. In other sections we sometimes find the opposite extreme, where cows are allowed to raise their own calves and possibly only one calf to a cow. This method is too expensive for raising steers and is practicable only where pure-bred calves of the beef breeds are being raised for breeding purposes, or steers for show purposes. There are some very successful farmers however, who make one cow raise two calves, and in some cases three calves during one period of lactation, and the remainder of the cows are milked by hand. This method has many things to recommend it where conditions are favorable, and where calves of about the same age can be procured. A smaller amount of milk will satisfy a calf when it draws it for itself, and by allowing the calves to do their own milking, considerable labor is saved, both in regard to milking and calf feeding.

By far the greater number of calves which are raised for market purposes are fed upon skim-milk, and it is possible to raise calves very successfully under this method. I am acquainted with one very successful breeder of dairy cattle who raises his calves without the use of skim-milk. The milk is sent to the cheese factory and consequently no skim-milk is available. His practice is to feed the calves on whole milk for the first five weeks of their lives. Then he begins to cut down a little on the milk and introduces a gruel made from oil cake. The milk is reduced very gradually and the oil cake gruel gradually increased. At first the calves will receive only about a tablespoonful of oil cake, and this quantity is increased until eventually the calves are taking at least half a pound of oil cake a day. It requires somewhere about five weeks from the time he starts to reduce the milk until it is withdrawn altogether, and during this period the calves are taught to eat so that by the time they are ten weeks old they are getting no milk whatever. Of course, these are calves of dairy breeds, and I do not think the method would be the most suitable one for steer raising, but it would certainly be a great deal better method than many methods employed at the present time in raising steers. Were it not for the labor involved, I think this method could be improved by gradually introducing hay extract, or hay tea, in the place of milk. Hay tea has been used in calf feeding for a great many years, and while it is not a perfect substitute for milk, at the same time it is considerably better than water, and I think it should work in well with the method which has just been described.

Where skim-milk is available, the difficulties do not altogether disappear by any means, and many calves are ruined by changing from whole milk to skim-milk suddenly, and in addition feeding them too much skim-milk. In feeding any class of stock, all changes should be made gradually. If it is necessary to make a change at all, some time should be occupied in bringing it about, otherwise there is danger of injurious results to the digestive organs. The more gradually changes are brought about, the more successful will be the feeder. For calves that are intended for beef I think that three weeks feeding with whole milk is not too much, and at least two weeks more should be occupied in changing gradually from the whole milk to skim-milk. Care must also be exercised not to over-feed with skim-milk, and I believe this is one of the commonest mistakes in skim-milk feeding. Ten pounds of whole milk a day is plenty for a calf up to the time it is three or four weeks old. By the time the change has been completed from whole milk to skim-milk, fifteen pounds of skim-milk per day is plenty and there are some very successful feeders who claim that at no time in a calf's life should it receive more than twenty-four pounds of skim-milk in a day. There are many calves permanently injured by over feeding with skim-milk, which tends to cause indigestion, and it is safer to slightly under-feed than to over-feed with skim-milk.

As to foods to be given with skim-milk, a great many things are recommended by different feeders, and there is little doubt that the feeder has a wide choice in the matter. Some feeders use oats, others use oil cake, others again use corn, or a mixture of oats and corn. Some use flaxseed, and in many respects flaxseed is preferable to oil cake for feeding with skim-milk, if it is used with care. Flax seed is richer in fat than oil cake, and if steeped in water so as to make a jelly it answers very well for the purpose of supplementing skim-milk. The flax seed jelly answers especially well for very young calves before they have commenced to eat well. When they can be got to eat grain, such as oats, or oats and corn, with perhaps a little bran and a very little oil cake, the need for the flax seed jelly practically disappears. I would prefer a mixture of oats, corn and bran to any one of these foods fed singly, though oats are certainly a very safe food for almost any class of stock. By the use of a little patience, a calf may be taught to eat at a very early age, and the sooner it can be taught to eat, the better.

I have attempted to point out some of the mistakes that are made in feeding calves, but there are many men who get along very well with their calves who make a fatal mistake later on. After the calves are weaned, and especially during the winter months after weaning, the farmer sometimes gets an idea that it does not pay to feed these calves well. They are therefore fed very little but straw, and possibly some silage or a few roots, and the result is they make little or no growth during the winter, and come out in the spring extremely thin. I have here some very instructive figures relating to results obtained at the Central Experimental Farm in experiments made by Mr. Grisdale. He found that skim-milk calves under eight months old, produced 100 pounds increase of weight at a cost of about $3.40. Yearlings cost about $4.30 for 100 pounds gain, and two years olds cost $5.99 per 100 pounds gain, which is an increase in the cost of 100 pounds of gain of $2.69 over the calves, and $1.69 over the yearlings. He also found that for a three-year old it costs $6.52 for 100 pounds gain in weight. In addition to these figures, I would like to give you a few more, representing the results of experiments at various American experiment stations, as well as from the Fat Stock Show at Chicago. These figures show that with steers from one to twelve months old, the cost of producing 100 pounds of gain ran from $1.87 up to $4.20; from 12 to 24 months old, it ran from $6.30 to $8.12, and from 24 to 36 months old it ran from $9.59 to $12.54. It will be seen, therefore, that the cost of producing 100 pounds of grain increases very rapidly as the steer grows older, and that the most economical use of food is made by the young animal. The farmer, therefore who starves these calves and yearlings, thinking it poor economy to feed them liberally at this early age, is making a very serious mistake. He is refusing to use a valuable machine just at that time when it can do the most effective work, and after he has checked its growth by poor feeding for two or three years, he then attempts to fatten the animal for market. The result is he has lost his opportunity to make money out of this animal, because he has failed to take advantage of the cheap gains it was capable of making when young, and he starts in to obtain his gains at a period in the life of the animal when it is not in a position to make the most economical use of food. I believe it can be demonstrated that to get the most profit out of a steer which we raise ourselves, he should be ready for market by the time he is two years old. In fact, in raising these steers they should be kept in such a condition that they are practically ready for the butcher at almost any time. The farmer need not be afraid of feeding these animals liberally because these young things are in the very best condition for using the food to good advantage. The farmer will also find that the market is always hungry for this class of animals, and he will have no difficulty in selling his product at a premium above the market price.

Q.—Do you recommend letting the calves run outside during the summer?

A.—We generally find that we get the best results if the calves are kept in a large airy shed where there is plenty of ventilation and room for exercise. If there is plenty of shade, a small pasture will answer very well.

Q.—Where they are kept inside, would you recommend letting them out at night?

A.—There can be no objection to letting them out at night in warm weather, and in fact the open air exercise will do them good.

Q.—What about feeding warm milk?

A.—I believe milk is better always to be fed warm.

Q.—At what age do you advise turning calves to grass?

A.—We do not turn them out until the second summer.

If the calves have a good airy pen in which to run, we generally find they do better than those which run in the pasture field with the cows. I do not think it is a good plan to shut calves up in small pens, I think it would be much better to let them run in the field than do this, but where suitable and roomy quarters are given them inside, I believe it is better to keep them in, especially during the very hot weather when flies are bad.

IS IT POSSIBLE TO BUILD UP AND MAINTAIN A HERD OF DUAL PURPOSE COWS?

By J. G. Clark, Ottawa.

In dealing with this subject I feel that I have something rather difficult to handle. It is a subject that has been discussed a great deal, and a great deal of difference of opinion seems to be manifested. Is it possible to build up and maintain a herd of dual purpose cows? I believe it is. But I believe also that the man who undertakes to build up and maintain a herd of dual purpose cows has to be satisfied with a smaller percentage of profit, and with smaller wages, than the man who breeds and maintains special purpose cows. The difficulty, and I think it is met with by all breeders, is that if we try to get beef and milk combined you cannot possibly get the best of either. You have got to be satisfied with a poorer quality of beef and with less milk. There are conditions in certain countries in which perhaps it is necessary for a man to try to get on his farm a herd of dual purpose cows. Perhaps he finds it difficult to get milkers and perhaps he has not a very good way of marketing his dairy produce. In that case it might be better for him to get dual purpose cows. If he does I think it is of the greatest importance for the sake of his own profit that he keep in mind always the production of beef rather than the production of milk. It is a difficult matter to get dairy cows handled properly and when a man undertakes to keep dairy cows, to go in for dairying as a special line and work it, it becomes necessary for him to get the very best cows he can get hold of. He is not doing that if he tries to get beef along with the milk. The difficulty, as I have said before, in the dual purpose herds is the difficulty of getting the profitable dairy cow combined with the profitable beef cow. Those of you who are acquainted with the matter know that up to the year 1887 we kept Shorthorns and Shorthorn grades, and I think I am safe in saying that we had as good strains of milkers as any Shorthorns I know of to-day; and yet in spite of the fact that we took all the pains possible to get the sires from the best dairy Shorthorns in every group of heifers there were several unprofitable milkers, and it just resolved itself into a matter of one half of the herd feeding the other half and leaving nothing for the owner. When a man is breeding for beef, I believe it is necessary that the milk production should be developed as far as he can but always keeping in mind the best production of beef rather than anything we can get out of the milk. It is necessary that the beef cattle should produce sufficient milk to assist in paying the expenses of the farm because as the figures very clearly show a man who depends on the production of the beef steer to pay his expenses and does not get anything out of the dam has a very narrow margin if he has any margin at all. Therefore it is necessary that we should develop the milking qualities of our cows even when we are in the production of beef. But I am firmly of opinion that the man who is in a locality where he can market his dairy produce to any advantage is much better to devote his time to building up a dairy herd and to leave the beef production out of the question altogether. This is a serious matter for many farmers and farmers require to compare notes. Let them take up the figures of men in a community that are breeding for milk, with those men breeding for beef and I think they will find that the man who is breeding for the best in the dairy market will compare favorably and will show a greater degree of profit than the man who is trying to get both. Just for the sake of argument let us concede that it is possible to make a profit out of a dual purpose cow. Where are we going to get the herd? You know that for years, ever since, I think the dairy show at Guelph has been under way, there has been offered a prize of $200 to the beef bred cow that can secure the highest number of points in the dairy test. That prize has been held up for years and as yet not a cow has been produced to win that prize. In Shorthorns alone there are more registered animals than all the other breeds combined and yet not one of those cows have been able, notwithstanding the vaunted milking qualities of Shorthorns, to come forward to win that prize. At Guelph there was only one Shorthorn that scored high enough to win money. At our own show none of them have scored enough points to win money. In view of these facts is it wise for farmers depending on their dairy products to get their profits, to continue to breed with beef bred sires expecting to get milking cows? Farmers who go in for raising milk have to work too hard. They cannot afford to get up year in and year out at four or five in the morning and work Sunday and Monday without getting some profit, and I hold they are not going to get that profit so long as they continue trying to get dairy cows from sires out of beef bred cows. If we are going to get our dairy products up to the standard that it is possible to get them then it is of the greatest importance that we should drop this foolish notion of breeding dairy cows with beef breeding stock. I have now to ask the meeting to discuss this matter.

Q.—Would you recommend mixing Ayrshire and the Jersey breed for dairying purposes?

A.—No, I would not. A satisfactory cross I find to be Ayrshire and the Shorthorn.

Q.—How many times would you cross?

A.—I think you could go right along. I think you get more benefit from the first cross than from the other crosses, but you go on improving all the time provided you make a wise selection of the sire you use. I think a man going out to buy a young bull has a great advantage because owing to the records being kept of the different breeds he can go out and ask for the records of ancestors of whatever animal he wishes to buy.

Q.—Do you think that the farmers in this country who are pursuing dairying are more prosperous than the men who are pursuing a course of mixing?

A.—I am sure of it.

Q.—Would you advise each breed to keep by itself?

A.—I think so. I think I could take a beef breed and make more money and pay little attention to milk than the man who tries to get both, because he does not get the best of either.

Q.—I understand you to be speaking of a grade herd of milkers. What percentage of those calves are usually heifers?

A.—About a half as a rule.

Q.—What do you do with the male calves?

A.—Take their skins off and feed them to the chickens. A man having good dairy cows can afford to throw his male calves in the manure heap and still be ahead. In Mr. Drury's speech at Guelph, he stated that some of his dual purpose cows gave him $48 worth of milk in the year. If he had said that the average production of his herd was $48 it might have been a fairly good average for a Shorthorn grade. But he did not, and even if he did that, he is a long way behind the average of the best dairy grade herds. I have here the results from twelve men who sent in their returns from the cheese factory in the Western Ontario competition. These were graded herds and they ran from $62.50 down to $40.51. I take it that dairying is too hard work for a man to do for small wages. If you are going to ask your sons and daughters to stay with the business it behoves you to put in their hands cows that will give them a good profit for their work.

Q.—Did the man who got $48 receive the same price for his milk as the man who got $60.

A.—Those twelve men were all on the same basis.

Q.—I would like to ask Mr. Clark if he knows what kind of milk they get in the City of London?

A.—I do not know.

Q.—Ninety per cent. of the milk that goes into London, England, is Shorthorn milk from dual purpose cows. There is where you get competition. That is where they have to get profit out of everything and where they have studied this question more than we have in Canada and they have come to the conclusion that they can make more money out of the dual purpose cows and make enough milk to supply London. Not only that, but where they have cows coming in from every country in the world, the Shorthorn has stood up there and taken prizes as a milk producer more than the representative of any other breed. Mr. Clark touched a vital point when he spoke about the farmers getting a good profit. I can tell you that the families of the people who are pursuing a special dairy course cannot get half paid, and when you go into the place you see broken down girls in three or four years. Go on the other hand to a farmer's place where they have cows that breed steers that will make a profit and get milk as well and you will find the women there are not broken down in that way. (Applause). I have spent a few days travelling through a special dairy country where they do not know what a good beef steer is, and I found half of the cows lying on the heap. Mr. Clark tells you that the prize at Guelph has been held up. There are reasons for that. Our cows do not come in the right time. It has not been customary to have our Shorthorn cows coming in and making a good competition.

Mr. Clark: Mr. Miller says we ought to be fair, but the importers who have been going to England year after year bringing out Shorthorns have not been fair or they would have brought some of those Shorthorns out here. (Applause). If you advocate dairy Shorthorns in this country you have got to bring them here to take them up. (Hear, hear). We have not got them, and it stands to reason that if the Shorthorn breeders of this country are going to advocate dairy Shorthorns they have got to bring dairy Shorthorns to make good. So far as the argument is concerned that they do not come in at the right time, I can assure you they would be in at the right time if they thought they could win. (Applause). I know a man who bought a cow that stood very high in the dairy test. She won the highest honors in the dairy test. He bought two more of the same family thinking that he was going to get good milkers but he did not. That is the trouble with the Shorthorn.

Prof. G. E. Day: I was brought up in a beef section in the county of Wellington and everybody in that section fed steers. In the adjoining township there was comparatively few steers fed. That was twenty-five years ago. They could get in our section half a cent more for their steers than in that next township for perhaps equally good steers. Now why was that? The reason was that there were so many good steers in our particular section that the buyers all flocked in and there was keen competition whereas in the other section it was so far to drive that competition was not so keen. I think anyone can understand from that illustration that it would be a very difficult matter attempting to raise steers in a dairy district or attempting to raise dairy cows in a beef section. In our own section we tried to raise for the cheese factories and they miserably failed. Here I can easily understand that a man starting out in beef breeding would have a hard row to hoe because he is in a dairy district. Every man will have to govern himself according to the conditions. I believe there is a place for the dairy cow, for the special purpose dairy cows, and for the special purpose beef cow and there is, I have no doubt, a place for the beef cow that will produce milk. But what might be a good place for the one might not be a good place for the other.

JUDGING BEEF CATTLE. (Illustrated.)

By Mr. Robert Miller, Stouffville.

This is a very perfect specimen of a steer. It is about 24 months old, and that, according to Professor Day and a great many other authorities, is the best age and most profitable age at which to sell beef cattle. This steer has been bred and kept and fed for special purposes—purely for beef purposes. The chances are that his dam was a good milker, and the chances are also that her milk was not very rich milk. I want to say here what everybody does not know, and what I found out myself not very long ago, that what we consider on the table a very poor milk will grow the best calf. If has been proved that for rearing a calf and bringing it at an early age to the very best stage of perfection you should have Holstein, or milk as poor as Holstein milk. If I was going to find any fault with this steer I would say it stands a little bit too high from the ground. The first view you should take of any animal is to stand away from him and see how you like him. If you are going to buy one out of the lot, you will not buy one that does not impress you on first appearances. If you do like him you will get a bit nearer and take a careful look at him. General appearances should be the first feature you should look at. If the steer is not too wild. you might get your hand on it and feel him over. Find whether his shoulder blades are well covered, whether he has a good neck vein. Fine long hair indicates good feeding qualities and a good constitution. Then you find whether the loin is good for that is a most important part, then you find that he has good rump steaks, you have a good round here. That is an important part. You have a good flank here and that goes to show that he is a good feeder. You also notice that his ribs are well covered.

Q.—Is there anything that indicates the quality of the flesh?

A.—A mossy, sappy coat of hair will indicate that you will get a sappy, juicy flesh.

Q.—Can you feed them too fat?

A.—We should not feed them too much past two years old. I do not think a person can emphasize too much the point made by Prof. Day when he said you should never let your cattle stand still. We all know that a great many people have turned out cattle in the spring of the year and perhaps let them return in the fall in no better condition. That time and feed was lost. We might keep them for ten years like that and get nothing. We should keep gaining a little bit all the time. It is very easy to feed them too fat, but not a common mistake.

Q.—Can you tell how the feeding of that steer was carried on?

A.—Mr. Leask is here and perhaps will tell us.

Mr. Leask: I both bred this steer and fed him. He sucked his dam until he was about nine months old, at the same time he was fed with turnips and oats. He is a spring calf and we kept him in both summers. In the winter we gave him all the turnips and clover hay he could eat.

HOW TO PROFITABLY INCREASE THE PRODUCTION OF THE AVERAGE DAIRY COW.

By H. H. Dean, Professor of Dairying, O.A.C., Guelph.

In the topic assigned to me there are four main points to consider and in addition, the question, How? The prominent features in the subject are: "Profit," "Increase," "Production," "Average Cow." A word on each of these before taking up the question of How?

By "profit" in the dairy we understand the excess of returns over the cost of production. The chief factors entering into the question of cost of production are land, labor, and capital invested in cows and feed. No person can show a profit in the dairy unless the returns from dairy products exceed rent value of land, fair wages for the farmer and his help—hired or otherwise, and interest on capital invested in live-stock, implements, and feed grown on the farm or purchased elsewhere. There is a very great need of our farmers doing some book-keeping. Two books should be found on every farm— an ordinary account book and a bank book. The great majority of dairy farmers are unable to say whether or not they are making a profit from their cows. This is scarcely consistent with modern methods of advanced agriculture.

It is said of the millionaire, Andrew Carnegie, that the watchword of the Pittsburg Steel Mills, while he was the owner, was "more steel and more profits each year." No matter what the production was in any year, he always looked for an *increase* the following year. He was able to enthuse all his men with this idea of *increased production* and *increased profits* each and every year. We are not holding up this as an ideal for dairy farmers, nor asking them to strive to become millionaires, as this is a very low standard of life; but many dairy farmers could with profit to themselves and value to their locality catch something of the spirit that animated the men connected with the Pittsburg steel mills. If a cow gives 4,000 pounds of milk or makes 160 pounds of butter this year; expect 5,000 or 6,000 pounds of milk and 200 to 250 pounds of butter next year and 8,000 to 10,000 the next year and thus increase the production and profit from the herd. It is seldom we receive more than we look for or expect. Expect increases, and increases are likely to come, *if we do our part.*

Production is a law of nature. The trees produce fruits: plants, flowers and beauty; animals, products of value to man, and man ought to be no exception to the rule. That man's life may be considered a failure which has not produced something of value to himself and his fellow men. The man, who by his skill and intelligence is able to increase the average milk production of cows by so much as 1,000 pounds per year is a benefactor of his race—much more so than the man who causes two blades of grass to grow where one grew before, because milk is a life-giving fluid for man and more valuable than grass.

The "average cow" is a conception of the mind and does not exist. It is well that this is so, else improvement of cows would be much slower than at present. The thing called "average cow" is the quotient, resulting from adding together the numbers representing "poor," "medium" and "good" cows and dividing by three. From the modern dairymen's viewpoint there should be no "poor" or "medium" cows. By recognizing only one class of cows, "the good" the labor of obtaining profitable production in the herd is reduced two-thirds. To be relieved of two-thirds of a load is an important point when travelling over a somewhat long and heavy road, such as must be travelled by most dairymen.

THE HOW: The how is an "oft repeated tale," yet not necessarily a "long tail." The process may be summed up in three short words, *Breed, Feed, Weed.*

We shall discuss in detail only the first point, *Breed.* We use the term in the sense of, to procreate, to beget, and not as applied to some special strain of cows. There are men who become excited as soon as the term "breed" is mentioned. Men who under ordinary circumstances are quite sane, become insane at the very mention of "breed," hence on public occasions it is seldom advisable to discuss "breed" in the ordinary acceptation of the meaning of the term. Judging from the way some men talk and write we shall soon need special lunatic asylums for persons suffering from breed-mania.

This is an age of inquiry. Not many years ago the "common people" accepted as the truth what was taught them in the synagogue and elsewhere and no one questioned the authority of the teacher. Maxims and sayings that have stood for the truth during many years are now being questioned. Have not many of us written the maxim, "Honesty is the Best Policy" many, many times in the old fashioned copy-book or as a penance for some misconduct at school? But in these modern times we are told that honesty is not a "policy," it is a *principle* or *axiom*. The word "policy" has degenerated in its significance now meaning much the same as "diplomacy," which latter term someone has defined as "polite lying."

At the meeting of the Eastern Dairymen's Association held in the Capital City, January, 1907, we were told by an eminent authority that "a little learning is *not* a dangerous thing." We can fancy how Pope must have writhed in anguish of spirit as the truth of this saying of his was questioned. His raspy irritable temper must have reached fever heat, though the month was January—on Mother Earth.

This brings me to the discussion of the maxim, which has long been considered the keystone of the breeder of domestic animals, viz., "Like produces like." In a discussion of the truth or otherwise of this maxim, it is not necessary to become excited or to say hard things of any one who questions the wisdom of that which has so long been regarded as truth. Let us look at the facts in a calm, inquiring manner and as seekers after the truth.

A prominent biologist tells us that everywhere he went in the domain of biological science he was met with the barrier, "no thoroughfare. Moses." In these modern times we frequently see barriers such as, "No thoroughfare. Tradition." "No Thoroughfare. Public Opinion." "No thoroughfare. Prominent Men." "No thoroughfare. Text Books." "No thoroughfare. Government." Nothwithstanding these barriers we make bold to question the truth of the maxim, "Like produces like."

First we may inquire what is reasonably meant by the term. We think it fair to infer, a something which we can comprehend with our senses produces or begets a something else which exactly corresponds with the first something, in form, color, etc. If this were true there would be no variety or improvement in nature. Nature abhors sameness, but loves variety. We have only to open our eyes to realize the truth of this statement. If "Like produces like" then the theory of descent, transmutation or evolution falls to the ground. According to Hackel, "The Theory of Descent or the Transmutation theory affirms that all organisms (viz. all species of animals, all species of plants which have ever existed, or still exist on the earth) are derived from one single, or from a few simple original forms and that they have slowly developed from these by a natural course of gradual change."

One of the fundamental principles involved in explaining the varied forms of life about us is "change." The poet says, "Change and decay in all around I see." A recent writer on the subject of breeding animals recognises this principle, and seeks to explain it by what he calls "The Law of Variation." This seems to us a misnomer. One might as well speak of "The Law of Chance," "The Law of Luck" or "The Law of Weather." We recognise that there are great variations in animal and plant life, but the causes of these are not well understood at the present time.

To bring the question more particularly to the point under discussion we may be allowed to cite a few instances in support of the statement that good cows do not necessarily produce good milkers which is the experience of nearly all dairymen. We may call them facts which indicate that "Like does not produce like" in dairy cows. We shall give the names of the cows, but not the breed for reasons already mentioned.

Name of Cow.	*Daughters or Granddaughters, Good Milkers.*
Artis Kassie	None. One daughter sold, said to have been good.
Beauty of Norval	One that promises well.
Lisgar's Rose	None.
Mercena 2nd	Two.
Margaret 4th	Two daughters, two granddaughters and one great granddaughter.
Patience	None.
Rena Burnett	One granddaughter.

All these cows, which represent three different "breeds," have stood out prominently in our herd as large producers, but we see how few of their progeny have similar charcteristics. Some may say, this may have been due to the use of poor sires. That may be true, but we were supposed to be using good males.

Time will not permit to go further in this discussion at present. There is great need of careful study and wise experiments on this question which is *the greatest of all dairy problems at present.* Looking about for a theory or hypothesis, as a starting point, we feel that Weisman's, "Germ Plasm Theory" is the best. All good practice is the result of a theory, "which must always be regarded only as an approximation to the truth. It must be understood that it may be replaced in time by another and better grounded theory. But in spite of this admitted uncertainity, theory is indispensable for all true science. It elucidates facts by postulating a cause for these."

In a word the "Germ Plasm Theory," which may be defined as, the hereditary or transmissible stuff theory, says that before any permanent change for the better can take place in animals a change must be brought about in the "germ plasm" which is transmitted from one animal to another. The possible explanation of the fact that it is difficult to get good milkers from good milkers, is that this "abundant milking quality" is an unstable characteristic—a sport. It has not become a permanent characteristic or in other words has not permeated the "germ plasm" or hereditary stuff.

If this theory be correct, the only way known at present by which the dairy farmer may be reasonably sure of obtaining good milkers is to breed for the purpose and have the environment suitable for the development of desired characteristics, and *continue until this acquired characteristic becomes fixed.* Personally, we think that a careful study of this matter will enable the scientist to discover the laws of improvement in the milking qualities of dairy cows by breeding. The science of Embryology we believe to be the key that will unlock the secret. Who will study it and give the results of their study to the people? The main difference in results between the old and new theory will be that good milkers will produce *better* milkers in contradistinction to having poor milkers producing poor or sometimes good milkers and good milkers producing sometimes good, but more often poor milkers, as we have them at present.

The second and third factors in the How, viz., "feed" and "weed" we shall not stop to discuss, as they have been debated these many years. There is practically nothing new to add on these points. For the benefit of those who would like to know the kind of feed given to our famous cow Boutsje, we append the average amounts of feed given daily, the approximate cost of her feed, together with her production in milk and butter and the profits on milk and butter, over cost of feed at the prices given for 120 days—Nov. 1st, 1906 to February 28th, 1907. For November and December, 1906, this cow was in charge of the Dairy Department and during January and February, 1907, she was in charge of the Farm Department. Mr. C. S. Wood, Herdsman at the Dairy Stable, had charge of her feed and milking during the four months. During November and December the cow was milked four times daily. For the other two months she was milked twice a day. The bulk of her feed was given at two feeds daily. In the evening she was fed long hay and whole mangels in addition to the regular feed. The bulky portion of her ration was prepared by mixing cut hay, corn silage, and pulped mangels for some hours before feeding. The meal was placed on this roughage at the time of feeding. About 1½ ounces of salt for each cow was added to the pile of roughage which was prepared daily for all the cows and out of which pile this cow was fed. She was given water at will. The amount of water drunk by her was weighed one day in November and it was found to be over 200 pounds.

BOUTSJE'S FEED AND MILK.

Following is a record of the pure-bred Holstein Cow, Boutsje, owned by Ontario Agricultural College, Guelph, Canada, the kind and cost of feed, the milk and butter record, and the profit over cost of feed for 120 days:

BOUTSJE'S FEED: November, 1906: Cost of feed for month of 30 days, $8.34.

Ration per day: Clover hay, 10 lbs.; silage, 20 lbs.; mangels, 40 lbs.; bran, 8 lbs.; oats, 6 lbs.; oil cake meal, 2 lbs.; corn chop or gluten feed, 1½ lbs.

December, 1906: Cost of feed for month of 31 days, $8.

Ration per day: clover hay, 10 lbs.; silage, 20 lbs.; mangels, 40 lbs.; bran, 5 lbs.; oats, 5 lbs.; oil cake meal, 2½ lbs.; corn chop, 2½ lbs.

January, 1907: Cost of feed for month of 31 days, $7.95.

Ration per day: Clover hay, 10 lbs.; mangels, 40 lbs.; silage, 25 lbs.; bran, 5 lbs.; oats, 5 lbs.; oil cake meal, 2 lbs.; corn chop, 2 lbs.

February, 1907: Cost of feed for month 28 days, $7.

Ration per day: Clover hay, 10 lbs.; mangels, 20 lbs.; silage, 40 lbs.; bran, 5 lbs.; oats, 5 lbs.; oil cake meal, 2 lbs.; corn chop, 1½ lbs.

Hay per ton, $8.00, Silage and Mangels $2.00, Bran, Oats and Corn 1 cent per lb. and Oil Cake Meal 1.75 cents per lb.

BOUTSJE'S MILK—November, 2,522 lbs.; 3.5% fat; average lbs. milk per day, 84.06
December, 2,352 lbs.; 3.7% fat; average lbs. milk per day, 75.90
January, 2,105 lbs.; 3.6% fat; average lbs. milk per day, 67.90
February, 1,770 lbs.; 4.1% fat; average lbs. milk per day, 63.21

Total lbs. milk in 120 days 8,749
Total lbs. butter in 120 days 377

Value of milk at $1.00 per 100 lbs, $87.49.
Value of milk at 4c. per quart, $139.84.
Value of butter at 25c. per lb., $94.25.

Cost of Feed for 120 days (approximately), $31.00.

Profit on milk over cost of feed, $56 or $108.
Profit on butter over cost of feed, $63.

RESULTS OF PRACTICAL EXPERIENCE IN THE KEEPING OF COW RECORDS.

By W. F. Stephen, Huntingdon, Que.

We have heard an interesting address from Prof. Dean on this very important subject of how to raise more productive dairy cows. As a manufacturer pays more attention to the details of his business in order that he may realize a larger profit, so also should the dairyman study his with the same end in view. I think that most of us are looking for more profit, and how that profit is to be obtained is interesting to most of us. Prof. Dean has said that he wants to set us thinking, for when we can get a man to think we can get him to act. Now the idea of my talk is to get you acting. How many dairymen are there here that keep cow records? I am glad that there are a few. Cow records are of modern institution. They were started in our country some seven or eight years ago, but we find that many dairymen had kept cow records in the United States upwards of fifteen or twenty years. There is only one way of proving what our cows are doing, and that is by keeping records, and I am to give you the results of a little practical experience. In order to do so I have to touch a little on my own business, although I do not care much about doing it. I first commenced this work in 1902, but previous to that I had been endeavoring to build up a good dairy herd by the selection of the best bulls I could get in the country and mating them with the best females and rearing their produce in the way that I think they should be raised for dairy work. I was fairly successful but I realized that I was not getting the returns I should, I began to realize that it was only business that I should know what I was doing, as the manufacturer tries to find the cost of the production of his manufacture, and what he is doing each year. I would point to the fact that many of us do not know what our herds are doing because we do not know how many cows we have that are boarders. I wanted to find out this for myself. I had received a great many letters from the United States each year asking the price of my young stock, and the question that was invariably asked was, what were the records of the dams. I could not give them because I had never kept any, but I started in 1902, and a year after I was able to give the record of the dams for that year. That is one reason why I wanted to keep cow records, but I also wished to find out the valuable cows in the herd, and then to weed out the poor ones; to know the effect of feeding on the milk flow, the cost of food in comparison, and other things which enter extensively into profit and loss and so I turned my attention to the scale. Let me call your attention to it. The scale is a very simple arrangement, and does not cost very much. Four dollars will purchase the weighing scale, and the milk forms you can make for yourself or get them from Ottawa, and so equip yourself for the most practical work you can carry on in connection with dairying, the most valuable and most instructive in the conduct of your farm. Let me say also that there is no better way of getting the boys and girls interested than by giving them charge of this department. They will take a great interest in the milk returns from day to day, noting the ups and downs, beginning to wonder at them and to inquire as to the cause. Now as to the time it will take each day. It will take just one half minute to weigh each cows milk each day, and you will find that no better investment can be made, nor time better spent than in weighing each cow's milk. If you don't care to weigh it every day you can do it one day per week, and that will be found sufficient to give you a record that will convey much valuable information. Composite samples of milk should be taken every month. The Babcock tester, or four bottle machine, only costs $6. Any intelligent man after a little practice, and closely observing the method will be able to make the tests. But if you don't want to do this work yourself get the tester at the creamery to do it for you. By a simple test you can find out the quality of the milk, and every month or six weeks you will be able to see which of the cows you are keeping as boarders and which at a profit. Let me give you a few figures. In 1902 when I commenced keeping records I had seventeen cows in my herd, four being only two year old heifers that dropped their first calf in the month of July, but which I have taken into the average. The average for that year was 6,250 pounds of milk over an average milking period of 280 days, percentage of butter fat 3.8 per cent. equal to 269 pounds of butter which at twenty two cents a pound gave an average for the year of 59.36. Now the best milker gave 9,907 pounds of milk, testing 3 per cent. butter fat, equal to 347 pounds of butter, value $76.34. I had another cow that did not give as much milk but a greater proportion of butter fat. The amount of milk I got from this cow was 8,584 pounds, testing 4 per cent, butter fat, equal to 400 pounds of butter worth $88. Now the difference of the value of the product of these two cows was $11.64 although this one gave the most profit and was milked 274 days, and the one which gave the most milk 300 days. The poorest cow in the herd gave 4,159 pounds of milk testing 3.7 per cent. butter fat, equal to 181 pounds of butter, value $39.82, the best cow's output being worth more than double that of the poorest's. The result of that year's work was that two of the boarders went to the butcher. I did not set the standard too high, fixing it at 6,000 pounds, and others that did not reach it I decided to give a chance for a second year to get up to that standard. In 1903 I had a herd of twenty-two cows and some heifers and the average yield of milk was 64 pounds lower that year than in the previous one, but the test for butter fat showed 3.95 per cent. giving the higher average of 286 pounds of butter worth $62.08. The best cow that year gave 8,129 pounds of milk, testing 4 per cent. butter fat, valued at $83.60. The best cow came within $4.40 of that of the previous year, and the poorest gave 3,341 pounds of milk, testing 3.7 butter fat, equal to 145 pounds of butter, worth $31.90 the value of the return of the best cow being $41.70 more than the poorest. In 1904 I had added four more cows, having twenty-six in all, and the average for the year was 6,646 pounds of milk, testing 3.9 per cent. giving 306 pounds of butter having a value of $67.07. The best cow gave 8,450 pounds of milk, testing 4.1 per cent. butter fat, giving 403 pounds of butter, worth $88.66, and the poorest 5,220 pounds of milk, testing 4.1 per cent. of butter fat, equal to 248 pounds of butter worth $54.36, the value of the return of the best cow being $34.30 more than that of the poorest. In 1905 I had increased my herd to 28 cows. The average yield of milk was 6,956 pounds, testing 3.9 butter fat, equal to 321 pounds of butter having a value of $70.75. The best cow gave 8,944 pounds of milk, testing 4.1 per cent. butter fat, equal to 427 pounds of butter worth $93.94. The poorest cow gave 4,635 pounds of milk, testing 4.6 butter fat, equal to 248 pounds of butter worth $54.56, or $39.38 below the return of the best cow.

The result of my four years work shows that I have increased the average yield of milk by 706 pounds, giving 52 more pounds of butter, and increased the value by $11.39. That is the result of four years of keeping cow records. The records are not very large but they have enabled me to weed out poor cows and to find out the true value of each of my herd. The weighing of my milk has enabled me to find the effect that the weather has on the milk flow. I found out that the effect of cold chilly weather was to pull down the milk flow from three to four pounds a day, and my aim is to obviate that by extra feed, although that will not always do it. I have the same difficulty in the winter time, and I found it best to keep my stable at a temperature of from fifty to fifty-five degrees, but during very cold weather when we have it exceedingly cold it is difficult to keep the temperature up to fifty, and I found that when the temperature in the stable dropped to forty that it affected the milk flow and caused an average drop of about three pounds a day per cow.

Q.—What about the cold rains?

A.—That also affects the flow. It is a difficult thing to obviate. If you have wood shelter where you can run the cows into it will help. I tried keeping them in the stable, but that does not do. The cold rains in the summer is one of the difficult conditions to deal with. The keeping of records has enabled me to ascertain the effect of feed on the milk flow. There are so many things which indirectly as well as directly have an influence on the flow of milk. If cows are accustomed to be fed at a certain time, and they are not they will worry and fret, or if they are chased by dogs, it will have an effect on the milk flow, which we do not discover until we have weighed the milk for some time. That is the great object in testing the milk from day to day, and I find it pays to weigh each day instead of once a week. Another point which I would like to mention is that for fourteen years my cows have never been turned out of the stable, from the time when they have gone in from the field about the middle of November until the first day of May, and they are stronger, healthier, and more vigorous than they were when they were turned from time to time, and there is not a case of tuberculosis amongst them. Of course it is necessary to have the stable well ventilated.

Q.—How often do you feed per day?

A.—I feed three times a day. That is another thing that the scale has enabled me to determine. I have heard a good deal about feeding twice a day, but I get more milk and the cows are in better shape with feeding three times. It has also proved to me the value of succulent palatable feed, and variety in it, which may be given without any great extra expense. The concentrated feed I use mostly is four pounds of bran, four pounds of oats with a little barley, and two pounds of peameal or gluten meal, which can be varied by the substitution of cotton seed meal for the pea meal or gluten and a pound of oil cake. We milk before feeding always in the morning and in the afternoon, and I feed liberally whether the cows are dry or not as I always want my cows to be in working condition, so as to drop a good calf, vigorous and ready to give a good milk flow after they freshen. I think there is little benefit in cut straw, except that it acts as a filler, but I get just about as good returns from a little cut straw fed with silage with the addition of 10 lbs. of mixed hay as from silage and hay.

Answering further questions, Mr. Stephen said that the use of shorts was all right except, perhaps, that they were a little fine. He did not feed turnips on account of their giving a flavor to the milk, and at the creameries in his district, and at Montreal, milk from turnip fed cows would not be accepted on that account. That was an argument in favor of the use of silage, which gave no distinctive flavor to the milk. He found it productive of the best results to water regularly four times a day, giving fresh water each time for water kept in front of the cows was liable to go bad. It might pay to temper the water but he had not tried it.

Mr. Stephen emphasized his remarks as to the results he had obtained during the four years in which he had kept records, and proceeding said that after making allowance for the cost of feed, etc., he was left in 1905 with a profit of $32.75 per cow. In addition there was the further profit from the manure. He maintained that it was possible for a man by adopting the methods he had advocated to increase the output of his cows by 1,000 pounds of milk per year, which meant if the system were universally adopted $20,000,000 more for the farmers of Canada. Watch the milk scale, and the milk flow, were the maxims that he urged they should follow.

FINANCIAL STATEMENT

OF THE EASTERN ONTARIO LIVE STOCK AND POULTRY SHOW

To January 31, 1907.

RECEIPTS.

Cash on hand	$760 40	
Legislative Grant for Show of 1906	4,300 00	
Legislative Grant for Show of 1907	4,300 00	
Legislative Grant to Seed Department, 1906	125 00	
Dominion Government Grant, Selling Class	42 00	
Advertising in Prize List	50 00	
Gate Receipts	339 20	
Fees for Entries and Poultry memberships	1,134 40	
Sale of Carcasses and Hides	1,023 94	
Poultry sold, Selling Class	125 50	
Dressed Poultry Sold	20 90	
Canadian Holstein-Friesian Breeders' Special prize	95 00	
Canadian Ayrshire Breeders' Special prize	15 00	
Miscellaneous	6 00	
		$12,337 34

EXPENDITURES.

Directors' Expenses	$167 45	
Secretary's Salary	300 00	
Postage and Stationery	113 00	
Printing and Advertising	494 76	
Office help and Expenses at Show	380 72	
Telegraph, Telephone and Express	67 79	
Judges and Lecturers	405 45	
Superintendent and Assistants	307 26	
Refund of Freight on Exhibits	232 00	
Expenses of Poultry Representatives to interview Minister of Agriculture, at Toronto	28 70	
Cash paid for Prizes	3,994 50	
To pay overdraft of Poultry Association	757 89	
Refunds of Entry Fees	63 75	
Birds sold, Selling Class	125 50	
Sale of Carcasses and Hides	1,025 92	
Heating Building	49 60	
Lighting Building	25 50	
Straw, Sawdust and Shavings	55 79	
Auditor	9 00	
Rent of Cots and Chairs	14 80	
Cleaning Stables after Show	15 00	
Block Test Expenses	19 16	
Poultry Feed and Supplies	53 67	
Dressed Poultry sold	20 90	
Reporting Meetings	60 00	
Miscellaneous	7 59	
		8,795 70
Cash on hand		$3,541 64

Examined and found correct,
this 2nd day of March, 1907.
(Signed) J. M. DUFF,
Auditor.

(Signed) J. C. SMITH,
President.
(Signed) A. P. WESTERVELT,
Treasurer.

OFFICERS AND COMMITTEES FOR 1908.

President	J. C. Smith, Hintonburg.
Vice-President	N. F. Wilson, M.P., Cumberland.
Secretary-Treasurer	A. P. Westervelt, Parliament Buildings, Toronto.

Directors.—J. C. Smith, N. F. Wilson, J. H. Grisdale, Ottawa; John Gardhouse, Highfield; John Campbell, Woodville; R. M. Wallace, Kars; R. Richardson, South March; R. H. Harding, Thorndale; P. O. Collins, Bowesville; John A. Belford, Ottawa; George Higman, Ottawa; W. F. Garland, Hintonburg.

Executive Committee.—The President, Vice-President, Secretary, J. H. Grisdale and John A. Belford.

Committee on Cattle.—J. H. Grisdale, John Gardhouse, N. F. Wilson, M.P., Thos. McDowell, Shawville, Que.: Hon. W. C. Edwards, Rockland; T. J. Graham, Mosgrove; R. Richardson, South March.

Committee on Sheep.—R. M. Wallace, R. Richardson, John Campbell, R. R. Sangster, Lancaster; J. Bradley, Carsonby; Andrew Cochrane, Almonte.

Committee on Swine.—R. H. Harding, J. C. Smith, R. Clark, Ottawa: J. H. Grisdale, P. O. Collins, David Barr, Jr., Renfrew.

Dairy Committee.—J. A. Ruddick, Ottawa; J. H. Grisdale, N. Sangster, Ormstown, Que.; W. H. McNish, Lyn: Jos. Meilleur, Ottawa.

Committee on Poultry.—John A. Belford, A. W. E. Hellyer, Geo. Higman, F. J. Blake, Almonte; Geo. Robertson, Ottawa; W. F. Garland, Galt; E. Brown, Pt. Fortune, Que.

Committee on Seeds.—George Boyce, B. Rothwell, F. Bradley, J. C. Stuart, G. H. Clark, L. H. Newman.

Advertising Committee.—J. C. Smith, J. H. Grisdale, John A. Belford and A. P. Westervelt.

Reception Commitee.—J. C. Smith, His Worship the Mayor of Ottawa, Ald. Rosenthal, G. H. Higman.

Live Stock Superintendent	Jos. Whitehead, Ottawa.
Poultry Superintendent	R. E. McKinstrey, Ottawa.

ONTARIO HORSE BREEDERS' ASSOCIATION.

Organization: At a meeting of horse breeders and others, held at the King Edward Hotel, on Friday, December the 28th, it was decided to organize an Association to be known as the Ontario Horse Breeders' Association, and incorporated under the Agricultural Associations Act.

Mr. C. C. James, Deputy Minister of Agriculture was in attendance at the meeting. Others present were,—T. A. Graham, Wm. Smith, Peter Christie, M.P., Dr. Andrew Smith, John Bright, John Boag, J. M. Gardhouse, John Gardhouse, George Pepper, E. C. H. Tisdale, W. J. Stark, James Torrance, A. G. Gormley, John J. Dixon, James Henderson, and H. M. Robinson.

Mr. T. A. Graham, of Claremont, was elected Chairman.

Mr. C. C. James was asked to address the meeting, and made the following suggestions for the Constitution of the Ontario Horse Breeders' Association:

The membership should consist of the members of the following Associations residing in the Province of Ontario, and who have recorded at least one pedigree as breeder or importer during the preceding calendar year, provided the Article following has been complied with:—The Canadian Clydesdale Association, The Canadian Shire Association, The Canadian Hackney Society, The Thoroughbred Horse Association, and any other Association which may be approved of by this Association, formed for the object of recording pure-bred horses, and whose admission has been approved by the Minister of Agriculture.

2. Each of the above named Associations should pay annually on or before the 15th of January of each and every year, $15 if the membership from that Association is under 50, and $30 if the membership from that Association is between 50 and 100, and $30 additional for each subsequent 100 or fraction of 100.

3. The Directors should be appointed at the annual meeting of the Association, and each Association represented should be entitled to two Directors for every 100 members or less, and one additional Director for each additional 100 members.

After some discusssion it was moved by Peter Christie, seconded by Dr. Andrew Smith, "That those present form the Ontario Horse Breeders' Association; that a Constitution be drafted, taking as a basis the suggestions made by Mr. James." Carried.

It was decided, however, that representation should be given to the Canadian Standard-bred Trotting Association, and the Canadian Pony Society, with the understanding that these two Associations should become incorporated under the Dominion Act respecting Live Stock Record Associations, during the next calendar year.

The following provisional Directors were appointed:—

Clydesdale Association: John Bright, John Boag, Jas. Torrance, A. G. Gormley, T. A. Graham, Peter Christie, M.P., Wm. Smith, Jas. Henderson.

Shire Association: J. M. Gardhouse, John Gardhouse.

Hackney Society: E. C. H. Tisdale, W. C. Renfrew.

Thoroughbred Society: John J. Dixon, Dr. Andrew Smith.

Standard-bred Association: Geo. Pepper, Jas. Wetheral.

Pony Society: W. J. Stark, H. M. Robinson.

A committee consisting of Wm. Smith, J. M. Gardhouse, T. A. Graham, Wm. Hendrie, Geo. Pepper, and W. J. Stark, was appointed to meet with A. P. Westervelt to draft a Constitution.

The meeting then adjourned, and arrangements were made to meet on Friday afternoon, January the 4th, to make arrangements for holding an Exhibition.

COMMITTEE ON CONSTITUTION

This Committee met at the Walker House on Thursday, January the 3rd, at 8 p.m.

There were present at the meeting; Wm. Smith, T. A. Graham, Geo. Pepper, J. M. Gardhouse, W. J. Stark, and A. P. Westervelt.

Mr. Wm Smith was appointed Chairman.

A Constitution was drafted, and it was decided to submit same to the meeting to held on the 4th of January. The meeting then adjourned.

ONTARIO HORSE BREEDERS' ASSOCIATION.

At the meeting held at the King Edward Hotel, on Friday, January the 4th. at 2 p.m., there was present, Wm. Smith, John Bright, John Boag, Jas. Torrance, A. G. Gormley, George Pepper, J. M. Gardhouse, Peter Christie, T. A. Graham, Jas. Henderson, E. C. H. Tisdale, W. C. Renfrew, H. M. Robinson, Dr. Andrew Smith, W. J. Stark, and A. P. Westervelt.

The minutes of the previous meeting were read and adopted, after which the Constitution as drafted by the Committee was read.

It was moved by **Wm. Smith**, seconded by J. M. **Gardhouse**, "That the Constitution as read be adopted; that the Provisional Directors named at the previous meeting shall constitute the members of the Association until such time as the Accountant of the National Live Stock Records can supply the names of the members from the various Record Associations, and further that the Board of Provisional Directors should constitute the Board of Directors of the Ontario Horse Breeders' Association for 1907." Carried.

The election of officers was then proceeded with, and resulted as follows:

OFFICERS FOR 1907.

President: **Wm. Smith**, Columbus.

Vice-President: T. A. **Graham**, Claremont.

Secretary-Treasurer: A. P. **Westervelt**, Toronto.

Auditor: J. M. **Duff**, Guelph.

Executive Committee: **Wm. Smith**, T. A. **Graham**, A. P. **Westervelt**, J. M. **Gardhouse**, **John Bright**, **George Pepper**.

Representatives to London Exhibition: **Jas. Henderson**, **Wm. Mossip**.

Representatives to Ottawa Exhibition: **Peter Christie**, T. A. **Graham**.

Moved by **George Pepper**, seconded by J. M. **Gardhouse**, "That our President, Mr. Smith, be appointed as our representative to the Canadian National Exhibition, and that the Secretary be instructed to write to the Manager of the Exhibition to make arrangements to grant us the representative on the Board." Carried.

Moved by **George Pepper**, seconded by A. G. **Gormley**, "That the appointment of the Committee to interview the Minister regarding the grant, and the appointment of the Committee to look into the question of a suitable building for the show be confirmed, and that we ask for their report." Carried.

W. J. STARK moved, seconded by JOHN BRIGHT,—"That the following gentlemen be appointed a Soliciting Committee, to obtain subscriptions, W. C. Renfrew, Jas. Torrance, John Boag, and W. J. Stark." Carried.

Moved by JOHN BRIGHT, seconded by JAS. HENDERSON, "That the arrangement of the prize list be left to the Executive Committee, with the addition of W. J. Stark to represent the Pony classes, and that a meeting be held at the Walker house, Thursday evening, January the 10th." Carried.

Moved by GEORGE PEPPER, seconded by A. G. GORMLEY, "That the Show be held on Wednesday, Thursday, Friday and Saturday, February 20th, 21st, 22nd and 23rd, 1907." Carried.

The following Judges were appointed:

Ponies: Dr. D. KING SMITH and LANCELOT STRUTHERS.
Standard Breds: ROBERT GRAHAM, and O. B. SHEPPARD.
Clydesdales and Shires: JAS. TORRANCE and JAS. HENDERSON.
Hackneys: WM. GIBSON and CAPTAIN ROBSON.
Thoroughbreds: MAJOR HENDRIE and MR. FULLER.

The meeting then adjourned.

The constitution of the Ontario Horse Breeders' Association as adopted at the meeting on January 4th, 1907, and approved of by the Hon. Nelson Monteith, Minister of Agriculture, reads as follows:

CONSTITUTION OF THE ONTARIO HORSE BREEDERS' ASSOCIATION.

1. This Association incorporated under "The Agricultural Associations Act," shall be known as the Ontario Horse Breeders' Association.

2. The object of this Association shall be: To encourage a general and constant improvement in horse breeding and a better organization of the interests of the breeders of horses throughout the Province:

(1) By co-operating with the Department of Agriculture.

(2) By holding meetings to discuss matters of importance to the horse industry of the Province.

(3) By co-operating with Exhibition and Live Stock Associations and Societies to advance the interest of the live stock industry generally, with special reference to the interests of the horse industry.

(4) By holding or assisting to hold competitive exhibitions and educational meetings.

MEMBERSHIP.

3. The membership shall consist of the members of the following Associations residing in the Province of Ontario, who have recorded at least one pedigree as breeder or importer during the preceding calendar year, provided Article 4 has been complied with:

The Canadian Clydesdale Association.
The Canadian Shire Association.
The Canadian Hackney Society.
The Canadian Thoroughbred Association.
The Canadian Standard Bred Trotting Association.
The Canadian Pony Society.

And any other Association which may be approved by this Association in accordance with Article 18, if said association has been formed for the object of recording pure-bred horses, and is incorporated under the Dominion Act respecting Live Stock Record Asssociations, and whose admission has been approved of by the Minister of Agriculture for the Province of Ontario.

(*a*) Provided, however, that this shall not prevent the privilege under this article being withdrawn from any of the Associations above named or hereafter to be admitted, if decided by this Association.

(*b*) Provided further that any of the Associations specially named or hereafter admitted, which shall during any calendar year cease to be incorporated as a Live

Stock Record Association under the Dominion Act respecting Live Stock Record Associations, shall forfeit all privileges and rights under any Article of this Association.

(*c*) Nothing in this Constitution shall prevent the expulsion of any member found guilty of dishonorable practices, and any member found guilty of such misdemeanor may be expelled at any annual meeting of this Association.

4. Each Association under Article 3 shall pay annually, on or before the 15th day of January of each and every year, $15, if the membership from that Association is under 50, and $15 additional for each additional 50 members or fraction of 50 members from said Association, eligible for membership in this Association. Each of said Associations shall also supply together with the said fees the list of its members eligible for membership in this Association, which list shall be certified as correct by the Accountant of the National Live Stock Records.

5. The business year of the Association shall commence on the first day of January of each year, and shall end on the 31st day of December following. The annual meeting shall be held at such time and place as the Executive may decide.

6. A special meeting of the Association may be called by the Executive. Notice of each annual and special meeting shall be mailed by the Secretary at least ten days prior to the date of meeting, to each member whose name and address is known to the Secretary. In the case of a special meeting, there shall be given at the same time, a statement as to the purpose for which the meeting is called.

7. Representatives to Exhibition Association, when such are to be appointed, shall be elected at the annual meeting. These representatives shall carry out such instructions as may be given them by this Association.

8. No person other than a member of this Association shall be entitled to vote or take part at any meeting of this Association.

OFFICERS.

9. The Directors shall be appointed at the annual meeting of this Association. Each approved Association shall be represented on the Board of Directors by two Directors elected from among the members from said Association, when the membership from said Association is 100 members or less, and by one additional Director elected from among the members from said Association for each additional 50 members or fraction of 50 members from said Association. The Director of the Live Stock Branch shall be an ex-officio member of the Association and a member of the Board of Directors.

10. The President and Vice-President shall be appointed by the Directors from among themselves at a meeting to be held as soon as convenient after the annual meeting. At this meeting an auditor, or auditors, shall be appointed for the current year.

11. The Secretary-Treasurer shall be appointed from among the Directors or otherwise, by the Directors of the Association, and shall hold office during the pleasure of the Board of Directors.

12. An Executive Committee shall be appointed to consist of the President, the Vice-President, the Secretary and three other Directors, to be elected at the first meeting of the Board following the annual meeting. The Directors may also elect such other committees as may be necessary.

13. Seven members shall be a quorum at any meeting of the Directors and three members shall be a quorum at any meeting of the Executive.

14. The Executive shall meet at the call of the President, or in his absence, of the Vice-President, on at least three days' notice.

DUTIES OF OFFICERS.

15. (*a*) The duties of the Executive shall be to prepare recommendations for Board Meetings, supervise finance, let contracts and arrange for printing and advertising, make necessary arrangements for holding exhibitions, and deal with such questions as have not been decided by the Board and carry out all matters referred to it by the Board. The President shall be Chairman of this Committee, and the Vice-President shall be Vice-Chairman. If necessary, the Executive may refer matters of detail to a smaller committee.

(*b*) The President shall preside at all meetings of the Board of Directors, and of the Executive, when present, and shall perform the duties usually appertaining to such office, and in his absence such duties shall be performed by the Vice-President, or in his absence by a Chairman to be chosen at the meeting.

(*c*) 1. The Secretary shall attend and be present at the meetings of the Association, Directors, Executive and Committees, and keep a true record of the transactions and proceedings at all such meetings, in a book or books, which shall be open to the inspection of the members thereof at all reasonable times. He shall also as such Secretary conduct all correspondence, issue all press and other reports and notices and prepare for publication the annual report.

2. He shall under the direction of the Executive carry out all arrangements for holding exhibitions, see that the buildings are prepared and ready for use at the proper time, and have all the necessary supplies and equipment ready for the exhibition. He shall, under the direction of the Executive and various Committees, attend to the arrangements of each department, and decide all matters such as the President, or Vice-President, acting in his absence, may not consider of sufficient importance to warrant him in calling a meeting of the Executive to determine. He shall prepare a programme for all exhibitions which the Board may from time to time determine to hold and report as to the staff of assistants necessary for such exhibition, and in general perform all such duties as usually devolve on such an officer under the direction of or subject to the approval of the Executive, and further do and perform all such acts, matters and things as would be required of him by any by-law or resolution or order of the Board of Directors in the office of Manager.

(*d*) 1. The Treasurer shall receive and have custody of moneys and valuable papers of the Association. He shall cause to be entered in books kept for that purpose a correct statement of all moneys received and disbursed on account of the Association, which books shall be open at all reasonable times to the inspection of the members thereof. The Treasurer shall prepare for the annual meeting a complete statement of the receipts and disbursements in which shall be shown the expenses of management, and shall perform such other duties in connection with the finances as may be required of him by the Constitution and the rules and regulations, and by the lawful orders and resolutions of the Board.

2. All funds shall be deposited to the credit of the Ontario Horse Breeders' Association in a chartered bank of the Dominion of Canada, to be selected by the Executive and all payments shall be made by cheque drawn on such bank by the Treasurer and countersigned by the President. In the absence of either of these officials, cheques may be signed by persons duly authorized by the Executive.

3. Accounts may be paid when passed by the President and Secretary, or in the absence of either of them by such person or persons as the Executive may authorize, but all accounts must be submitted to the Executive for inspection at the first meeting following.

4. Accounts for travelling expenses must be given in detail and all payments of $2.00 and upwards must be accompanied by vouchers.

5. Pay sheets of employees shall be certified to by the Superintendent, assistant superintendent, or the official in charge.

(*e*) The auditor or auditors shall annually examine and report upon all accounts affecting the Association, or relating to any matters under its control or within its jurisdiction, for the year ending on the thirty-first of December next preceding each annual meeting, and shall verify the detailed statement to be annually prepared by the Treasurer in such form as the Directors may require, and report in duplicate upon all the accounts audited by him and make a special report of any expenditures made contrary to the Constitution, rules and regulations, and generally do and perform all acts devolving upon auditors or which may be required by the Directors.

16. The actual and necessary travelling expenses may be paid of members of the Board of Directors attending Board meetings, and of the members of duly appointed committees when performing the duties in connection with their office.

17. When practicable the business of the Board or of any Committee may be conducted by correspondence.

18. Any part of this Constitution or any by-laws of the Association may, subject to the Act of Incorporation, be amended or changed at any annual or properly called special meeting, by two-thirds vote of the members present at each meeting.

(*a*) Provided that any member desiring to introduce any addition or amendment to the Constitution or by-laws shall so notify the Secretary in writing at least fifteen days prior to the date of any meeting of the Association, and shall enclose with such notice a copy of proposed addition or amendment. A copy of the proposed addition or amendment shall then be sent by the Secretary to each known member of the Association ten days before the date of holding meeting.

19. The order of business at all meetings of this Association shall be:

1. Reading Minutes.
2. Reports of Officers.
3. Reports of Committees.
4. Election of Officers.
5. New Business.
6. Adjournment.

ONTARIO HORSE BREEDERS' EXHIBITION.

HELD IN THE ST. LAWRENCE ARENA, TORONTO, ON FEBRUARY 20th TO 23rd, 1907.

LIST OF PRIZE WINNERS.

Clydesdale Stallions, Foaled Previous to January 1st, 1903.

1st—Acme (imp.) [6187] (10485), bay, face and three legs white, near fore foot white and leg black, foaled June 28, 1897. Bred by Andrew Donnan, Shaddock, Whithorn, Scot. Imported and exhibited by O. Sorby, Guelph, Ont.; sire, Baron's Pride [3067] (9122); dam, Sibyl Gray [4019] (13049), by Orlando [3046] (8092).

2nd—Prince of Mayfield (imp.) [6095] (12289), bay, face and hind legs white, white stripe on near fore leg, foaled May, 1901. Bred by P. McFarlane, Port Street, Stirling, Scot. Imported and exhibited by Smith & Richardson, Columbus, Ont.; sire, Royal Stamp (10442); dam, Lady Clare (14613), by Prince of Carruchan (8151).

3rd—Castle King (imp.) [5753] (12517), black, stripe on face, fore legs white, off hind leg white, foaled March 19, 1902. Bred by Wm. Watson, Millom Castle, Cumberland, Ont. Exhibited by Hamilton & Hawthorne, Simcoe, Ont.; sire, Sir Everest (10917); dam, Nell of Millom Castle (15335), by Londonderry (7934).

4th—Lyon Stewart [2732], bay, stripe in face, white rings on fore fetlocks, hind feet white, foaled June 7, 1898. Bred by Jas. Stewart, Springbank, Ont. Exhibited by H. G. Boag, Barrie, Ont.; sire, Lassodie Rover (imp.) [2725] (9779); dam, Houstin Lassie (imp.) [679], by Waterlee Lyon (2266).

5th—Culdrain Prince (imp.) [6148] (12117), brown, blaze on face, near hind foot white, foaled March 29th, 1902. Bred by Lieut.-Col. C. G. Gordon, Culdrain, Gartly, Scot. Imported and exhibited by T. H. Hassard, Millbrook, Ont.; sire, Prince Thomas (10262); dam, May of Culdrain (12489), by Maclennan (6048).

6th—Adam Bede (imp.) [4783] (11992), brown, stripe, near fore and both hind legs white, foaled May, 1902. Bred by Adam Gray, Ingleston of Borgue Kirkcudbright, Scot. Exhibited by Ambrose Lewis, Ringwood, Ont.; sire, Baron's Pride [3067] (9122); dam, Sweetmeat [6319] (14595), by Macgregor (1487).

7th—Prince Victor (imp.) [5785] (12707), bay, grey hairs, white face, four white legs, foaled June 26, 1902. Bred by Jas. McLaren, Alton, Stirling, Scot. Imported and exhibited by O. Sorby, Guelph, Ont.; sire, Royal Favorite (10630); dam, Lilly of Alton (16229), by Sir Everard (5353).

8th—Gallant Barrie (imp.) [4288] (11714), bay, stripe, hind feet white, foaled May 24, 1901. Bred by Jas. Barrie, Aberdeen, Scot. Exhibited by T. D. Elliott, Bolton, Ont.; sire, Prince Thomas [4028] (10262); dam, Balmedie Sweetheart (12831), by Balmedie Prince (7454).

9th—King Alfred (imp.) [5786] (11762), brown, small patch of white on face, near hind foot white, foaled May 24, 1900. Bred by J. E. Scoddart, Howden, Mid-Calder, Scot. Exhibited by J. W. Lowes, Bethany, Ont.; sire, Prince Alexander (8899); dam, Fanny of Howden (13292), by Hyndford (7837).

Clydesdale Stallions, Foaled in 1903.

1st—Baron Richardson (imp.) [5320] (12842), bay, patch on face, four white legs, foaled July 6, 1903. Bred by Alex. MacIntosh, Greenhill, Houston, Scotland. Imported and exhibited by Smith & Richardson, Columbus, Ont.; sire, Baron o' Bucklyvie [5353] (11263) dam, Minnie of Greenhill [7335] (16213), by Sir Donald [7331] (10456).

2nd—Vigorous (imp.) [6152] (12776), brown, patch on face, hind feet and one fore foot white, foaled June, 1903. Bred by Robt. McDowall, Auchengaillie, Scot. Imported and exhibited by T. H. Hassard, Millbrook, Ont.; sire, Up To Time (10475); dam, Maggie of Changue (15644), by Belvidere (9128).

3rd—Whinbloom (imp.) [6097] (12785) bay, stripe on face, four white legs, foaled July 6, 1903. Bred by J. C. Robertson, Fodderty, Dingwall, Scot. Imported and exhibited by Smith & Richardson, Columbus, Ont.; sire, Prince Thomas (10262); dam, Gartly Favorite (14322), by Prince of Carruchan (8151).

4th—Dunure Baron (imp.) [6150] (12561), bay, white face, near hind leg grey, other three legs white, foaled May, 1903. Bred by J. E. Kerr, Harviestoun. Imported and exhibited by T. H. Hassard, Millbrook, Ont.; sire Baron o' Buchlyvie (11263); dam, Scottish Dandy (14389), by Royal Gartly (9844).

5th—Baron Hugo (imp.) [5737] (Vol. 29, S.), dark brown, face, fore feet and hind legs white, foaled May 19, 1903. Bred by Jas. Douglas, Rosebaugh, Avoch, Scot. Imported and exhibited by G. A. Brodie, Bethesda, Ont.; sire, Sir Hugo [4923] (10924); dam, Princess Katrine [8585] (14213), by Prince Albert of Rosebaugh [2888] (9357).

6th—The Nobleman (imp.) [5768] (12770), bay, white stripe on face, foaled June, 1903. Bred by John Meikle, Craigorie, Clackmannan, Scot. Imported and exhibited by H. G. Boag, Barrie, Ont.; sire, Hiawatha (10067); dam, Pearl (15681), by The Most Noble (10657).

Clydesdale Stallions, Foaled in 1904.

1st—Royal Ardlethen (imp.) [6902] (Vol. 30, S.), dark brown, white face, near fore foot and hind legs white, foaled 1904. Bred by Thos. Winter, Meaburn Hall, Crosbie, Eng. Imported and exhibited by Thos. Mercer, Markdale, Ont.; sire, Ardlethen [4948] (11246); dam, Bella of Meaburn Hall [10076] (18517), by Eastfield Laird [4677] (6720).

2nd—Baron Buchanan (imp.) [6101] (Vol. 29, S.), brown, foaled 1904. Imported and exhibited by Smith & Richardson, Columbus, Ont.; sire, Baron Robgill (10689); dam, Lily of the Mill (Vol. 29, S.).

3rd—Baron Acme (imp.) [5748] (Vol. 29, S.), black, stripe, little white on outside of fore and inside of off fore foot, hind legs white, foaled June, 1904. Bred by Jas. Main, Tounfoot, Dolphinston, Scot. Imported and exhibited by O. Sorby, Guelph, Ont.; sire, Acme [6187] (10485); dam, Summit Queen [9651], by The Summit [3752] (9442).

4th—Lord Newlands (imp.) [6468] (Vol. 29, S.), bay, white on face, three white legs, foaled June, 1904. Bred by Robt. Pate, South Draffan, Lanarkshire, Scot. Imported and exhibited by Jno. A. Boag & Son, Ravenshoe, Ont.; sire, Good as Gold [6153] (11733); dam, Bell of Draffan [8308] (13229), by Rosedale (8194).

5th—Sir Henry (imp.) [6104] (13200), bay, foaled 1904. Imported and exhibited by Smith & Richardson, Columbus, Ont.; sire, Prince Thomas (10262); dam, Gem (16106).

6th—Gallant James (imp.) [5752] (12985), brown, foaled May 7, 1904. Bred by Jas. M'Alister, Meikle, Kilmony, Scot. Imported and exhibited by Andrew Aitchison, Guelph, Ont.; sire, Baron of Bucklyvie (11263); dam, Jessie (13147), by Prince Gallant (6176).

7th—Ardlamont (imp.) [5759] (12803), bay, white face, small white spot on near side of lower lip, hind legs white to hocks, foaled May 8, 1904. Bred by Neil Nicholson, Auchgoyle, Scot. Imported and exhibited by Thos. Mercer, Markdale, Ont.; sire, The Real Mackay [5769] (11968); dam, Darling of Auchgoyle [10059] (16985), by Toward Castle [5239] (9863).

8th—Prospector (imp.) [6145] (Vol. 29, S.), bay, foaled 1904. Bred by Jno. Paterson, Wester View, Scot. Imported and exhibited by T. H. Hassard, Millbrook, Ont.; sire, Lord Londonderry (10585) dam., Fanny of Brownfield (Vol. 29, S.).

9th—Blacon Hero (imp.) [5747] (12865), bay, stripe, fore ankles and near hind ankle white, little white on off hind hoof head, foaled June 4, 1904. Bred by A. Morrison, Craigberoch, Rothesay, Scot. Imported and exhibited by O. Sorby, Guelph, Ont.; sire, Pride of Blacon [4072] (10837); dam, Tibbie, by General Lockhart [5749] (8425).

Clydesdale Stallions, Foaled in 1905.

1st—Baron Columbus (imp.) [6106] (Vol. 29, S.), bay, foaled 1905. Bred by Mr. Dow, Littleton, Girvan, Scot. Imported and exhibited by Smith & Richardson, Columbus, Ont.; sire, Baron of Buchlyvie [5353] (11263); dam, Peebles Mare [9177], by Montrave Mac [3087] (9953).

2nd—First Baron (imp.) [6413] (Vol. 29, S.), bay, blaze, four white legs, foaled 1905. Bred by Jas. Hamilton, Drumburle, Ayr, Scot. Imported and exhibited by T. H. Hassard, Millbrook, Ont.; sire, Hiawatha [3430] (10067); dam, Jean of Drumburle [9879] (Vol. 29, S.), by Triumph [6414] (9864).

3rd—Passport (imp.) [6107] (Vol. 29, S.), bay, foaled 1905. Bred by Jas. Paterson, Burnbank, Blair Drummond, Scot. Imported and exhibited by Smith & Richardson, Columbus, Ont.; sire, Marmion (11429); dam, Mayflower [9178] (Vol. 29, S.), by Baron's Pride [3067] (9122).

Clydesdale Mares, Foaled Previous to January 1st, 1904.

1st—Meg (imp.) [9408] (Vol. 28, S.) bay, face and legs white, foaled May 26, 1903. Bred by A. S. Ritchie, Fancy Farm, Greenock, Scot. Imported and exhibited by T. H. Hassard, Millbrook, Ont.; sire, Elator [5080] (10340); dam, Daisy of Fancy Farm [9407] (14783), by Prince Frederick [3473] (8905).

2nd—Ardyne Bell (imp.) [10029] (Vol. 28, S.), black, hind legs white, foaled May, 1903. Bred by D. & J. Miller, Berfern Farm, Innerkip, Scot. Imported and exhibited by Andrew Aitchison, Guelph, Ont.; sire, Elator (10340); dam, Bell of Berfern (16938), by Woodside Prince (4116).

Clydesdale Mares, Foaled in 1904.

1st—Fifeshire Lass (imp.) [9581] (Vol. 29. S.), bay, face and legs white, foaled June, 1904. Bred by And. Dykes, West Finglassie, Fifeshire, Scot. Exhibited by Hodginkinson & Tisdale, Beaverton, Ont.; sire, Time Enough [6293] (11971); dam, Jubilee Queen [9582] (Vol. 29, S.), by Mains of Airies [2865] (10379).

2nd—Silver Queen (imp.) [9579] (Vol. 27. S.), bay, white mark on face, fore feet and hind legs white, foaled June 2, 1904. Bred by Robt. Paterson, Hill of Drip, Stirling, Scot. Exhibited by Hodgkinson & Tisdale, Beaverton, Ont.; sire, Royal Favorite [4052] (10630); dam, Peggy of Hill of Drip [9578] (15733), by Baron's Pride [3067] (9122).

3rd—Fashion's Gem (imp.) [9722] (Vol. 29, S.), brown, white on face, hind ankles legs white, foaled June 16, 1904. Bred by Wm. Blamire, Burgh-le-Sands, Carlisle, England. Imported and exhibited by T. H. Hassard, Millbrook, Ont.; sire, Baron's Fashion [6247] (10973); dam, Crosby Belle 2nd, by Knight of Drumlanrig [6361] (9777).

4th—Miss Pattinson (imp.) [10000] (Vol. 29, S.), bay, stripe, near fore and hind legs white, foaled 1904. Bred by Jno. Pattinson, Broomfield, Hall, Carlisle, Eng. Imported and exhibited by Jno. A. Boag & Son, Ravenshoe, Ont.; sire, Lord Londonderry [6162] (10585); dam, Mourner, by Farmer's Profit [6367] (9207).

5th—Lady Dick (imp.) [9989] (Vol. 29, S.), bay, white hairs, face and hind legs white, foaled May, 1904. Bred by Jas. Dick, Ballinton, Kippen, Scot. Imported and exhibited by Jno. A. Boag & Son, Ravenshoe, Ont.; sire, Marmion [5466] (11429); dam, Sally [9991] (Vol. 29, S.), by Mercury [6469] (9614).

6th—Lady Barclay (imp.) [8591] (Vol. 29, S.), light brown, white face and four white legs, foaled July 6, 1904. Bred by Patrick Barclay, Manorleys, Lochgelly, Scot. Exhibited by Walter Leonard, Craigvale, Ont.; sire, Sir Simon [5406] (10465); dam, Love [8589] (Vol. 29 S.), by Knight of Ellerslie (3737).

Clydesdale Mares, Foaled on or Subsequent to Jan. 1st, 1905.

1st—Queen's Maid (imp.) [9580] (Vol. 28, S.), brown, face and underlip white, white mark on front of off fore leg, hind legs white, foaled June 7, 1905. Bred by Robt. Paterson, Hill of Drip, Stirling, Scot. Exhibited by Hodgkinson & Tisdale, Beaverton, Ont.; sire, Royal Favorite [4052] (10630); dam, Peggy of Hill of Drip [9578] (15733), by Baron's Pride [3067] (9122).

2nd—Heather Bell (imp.) [10027] (Vol. 29, S.), brown, white mark on face, near fetlock and hind legs white, foaled June 10, 1905. Bred by Hugh Maclean, Locherbie, Scot. Imported and exhibited by And. Aitchison, Guelph, Ont.; sire, Ascot (10494) dam, Daisy (Vol. 29, S.), by Gold Mine (9540).

3rd—Fanny of Greenfield (imp.) [9119] (Vol. 29. S.), dark brown, stripe, near fore and both hind feet white, foaled May 7, 1906. Bred by Wm. Coulthard, Greenfield, Scot. Imported and exhibited by Thos. Mercer, Markdale, Ont.; sire, Royal Citizen [5374] (11896); dam, Jean [6147] (Vol. 27, S.), by Belted Prince [4752] (8459).

4th—Darkie of Culton (imp.) [9998] (Vol. 29, S.), black, stripe, near hind leg white, foaled 1905. Bred by Jno. Blamire, Culton Grange, Cumberland, Eng. Imported and exhibited by Jno. A. Boag & Son, Ravenshoe, Ont.; sire, Gartly Brand [6475] (12159); dam, Gavina McCamon [9999] (Vol. 29, S.), by McCamon (3818).

5th—Longburgh Lass (imp.) [10703] (Vol. 30, S.), bay, with grey hairs, foaled April 20th, 1905. Bred by Robt. Reay, Went End Farm, Carlisle, Eng. Imported and exhibited by Thos. Mercer, Markdale, Ont.; sire, Picador [5780] (10833); dam, Fancy of Longburgh [10709] (14481), by Lord Lothian [3513] (5998).

Canadian Bred Clydesdale and Shire Stallions, Foaled previous to Jan. 1st, 1905.

1st—Prince of Gladden [6222], bay, stripe, white legs, foaled May 19, 1904. Bred by Jno. Lawrie, Malvern, Ont. Exhibited by Smith & Richardson, Columbus, Ont.; sire, Hopewell (imp.) [3377] (11375); dam, Bounce [3879], by Prince of Blantyre [2239].

2nd—Bold Archer [5477], bay, face and legs white, foaled July 29, 1903. Bred by S. A. Devitt, Cadmus, Ont. Exhibited by Smith & Richardson. Columbus, Ont.; sire, The Archer (imp.) [1259] (4951); dam, Lady May [1618], by Royal Lawrence (imp.) [1259] (4951).

3rd—Royal Prince [3802], bay, narrow stripe, hind legs white, foaled May 28, 1901. Bred by Jno. D. Morrison, Argyle, Ont. Exhibited by Hodgkinson & Tisdale, Beaverton, Ont.; sire, The Royal Standard (imp.) [2220] (10014); dam, Highland Queen [2576], by Mariner (imp.) [718] (6073).

4th—Golden Conqueror [4251], chestnut, white face and feet, foaled July 27, 1902. Bred by A. Doherty, Ellesmere, Ont.; exhibited by Jos. E. Teeson, Thornhill, Ont.; sire, Cloth of Gold [2959] (8962); dam, Daisy Belle [2596], by Bruce (imp.) [1595] (8496).

5th—Sir William Walter [6220], dark bay, stripe, four white feet, foaled May 8, 1904. Bred and exhibited by A. E. Frisby, O'Sullivan's Corners, Ont.; sire, Balmanno (imp.) [3703] (10676); dam, Lady Walter [3919], by Lord Walter (imp.) [1033] (4543).

6th—Lavender's Best [6320], dark bay, stripe, hind feet white, foaled June 10, 1904. Bred by Wm. D. Beath, Columbus, Ont. Exhibited by Smith & Richardson, Columbus, Ont.; sire, Lavender (imp.) [3375] (11394); dam, Lakeview Kate [9668], by Lawers Baron Gordon (imp.) [1005] (5136).

7th—Balmanno Pride Prince [5798], bay, white stripe on face, off front foot little white, hind legs white, foaled July, 1903. Bred and exhibited by W. J. Howard & Sons, Amber, Ont.; sire, Balmanno (imp.) [3703] (10676); dam, Dandy B. (Vol. 15), by Lyon Macgregor (imp.) [2308].

Canadian Bred Clydesdale and Shire Stallions, Foaled on or Subsequent to January 1st, 1905.

1st—Scottish Commander [5485], light bay, face, off fore pastern and three legs white, foaled July 4, 1905. Bred and exhibited by Geo. Clayton, Peepabun, Ont.; sire, Scottish Celt (imp.) [2749] (10007); dam, Fan Borthwick [5263], by Lord Borthwick (imp.) [442] (4513).

2nd—Baron Charming [5784], bay, stripe, near fore and both hind legs white, foaled May, 1905. Bred and exhibited by O. Sorby, Guelph, Ont.; sire, Elator (imp.) [5080] (10340); dam, Miss Charming [2605], by Lord Charming [2264].

3rd—Nelson Foremost [5636], dark brown, stripe, hind ankles white, foaled April 21, 1905. Bred and exhibited by R. B. Cowie, Derryville, Ont.; sire, Foremost (imp) [3364] (11339); dam, Derryville Beauty [8360], by Carstairs (imp.) [1277] (3490).

4th—Earl Macqueen [8115], bay, foaled May 28, 1905. Bred and exhibited by David Pilkey, Balsam, Ont.; sire, Macqueen (imp.) [462] (5200); dam, Dolly Minty [8114], by Sir Arthur (imp.) [1371] (6292).

Canadian Bred Clydesdale and Shire Mares, Foaled Previous to Jan. 1st, 1904.

1st—Minnie of Amber [4779], bay, stripe, near forefoot and near leg white, foaled June 20th, 1901. Bred by S. Wilcox, Thornhill, Ont. Exhibited by W. J. Howard & Sons, Amber, Ont.; sire, Janitor (imp.) [2433] (10206); dam, Peggy Richmond [4170], by Richmond (imp.) [338] (4666).

2nd—Balmanno Kate [4778], bay, small stripe, near fore and both hind feet white, foaled May 26, 1902. Bred by W. Cummer, Dollar, Ont. Exhibited by W. J. Howard & Sons, Amber, Ont.; sire, Balmanno (imp.) [3703] (10676); dam, Jennie Shier [4782], by British Commander (imp.) [864].

Canadian Bred Clydesdale and Shire Mares, Foaled in 1904.

1st—Lady Lavender [10061], bay, foaled May 15th, 1904. Bred by S. Bond. Exhibited by Smith & Richardson, Columbus, Ont.; sire, Lavender (imp.) [3375]; dam, Doll [10063], by Portland (imp.) [3189].

2nd—Miss Lavender [7299], bay, stripe, fore feet white, foaled June 12, 1904. Bred by Fred Richardson, Columbus, Ont. Exhibited by Smith & Richardson, Columbus, Ont.; sire, Lavender (imp.) [3375] (11394), dam, Belle McGregor [4851], by Sir Erskine (imp.) [2119] (8253).

Canadian Bred Clydesdale and Shire Mares, Foaled on or Subsequent to Jan. 1st, 1905.

1st—Blair Gowrie Lass [9062], bay, stripe, foaled June 20, 1905. Bred by Fred. Richardson, Columbus, Ont. Exhibited by Smith & Richardson, Columbus, Ont.; sire, Michaboe (imp.) [4256] (11434), dam, Blair Gowrie 2nd [3320], by New Day (imp.) [1912] (8076).

2nd—Mysie [9063], dark bay, stripe, hind legs white, foaled July 15, 1905. Bred by Fred. Richardson, Columbus, Ont. Exhibited by Smith & Richardson, Columbus, Ont.; sire, Prince of Scotlandwell (imp.) [4257] (11860); dam, Lady Sally (imp.) [4774], by The Dean [4033] (10937).

Shire Stallions, Foaled Previous to Jan. 1st, 1904.

1st—Berrywood Drayman (imp.) [Vol. 2] (22107), bay, blaze, white hind legs, foaled 1902. Bred by W. and S. Spokes, Upton Lodge, Northampton, Eng. Exhibited by Thos. Skinner, Mitchell, Ont.; sire, Iceland (16734); dam, Berrywood Smiler (27520), by Carlton Valiant (9073).

2nd—Ranging Duke (imp.) [491] (21784), bay, blaze. white hind legs to hocks, foaled 1899. Bred by Joseph Waltho, Newborough, Eng. Exhibited by Hamilton & Hawthorne, Simcoe, Ont.; sire, Ridware Ranger (12155); dam, Smiler (43319), by Duke of Cambridge 2nd (3607).

3rd—Grimsargh Admiral (imp.) (22408), brown, foaled 1902. Bred by Geo. Corless, Park Head, Barton, Preston, Eng. Exhibited by J. B. Hogate, Weston, Ont.; sire, Gunthorpe Advance (13136); dam Madge (32999), by Stroxton Tom (15871).

4th—Merrie Andrew (imp.) [415] (18208), chestnut, foaled 1898. Bred by Andrew Dale, Cheddleton, Leek, Eng. Imported and exhibited by Joseph Jacobs, Peterborough, Ont.; sire, Harold (3703); dam, Princess Mary (Vol. 16, E.), by King William 3rd (6019).

5th—General Buller (imp.) [416] (18753), bay white blaze, white near hind pasterns, foaled 1899. Bred by A. James, Ruddington, Nottingham, Eng. Imported and exhibited by Joseph Jacobs, Peterborough, Ont.; sire, Ruddington Lord Chancellor (14259); dam, Heath Queen (12503), by Duke of Normandy (4359).

6th—Scarcliffe Pilot (imp.) [417] (21845), bay, white legs, foaled 1901. Bred by Jno. Burton, Kedleston, Derby, Eng. Imported and exhibited by Joseph Jacobs, Peterborough, Ont.; sire, Saxon Pilot (16383); dam, Markeaton Belle (18549), by Lincolnshire Boy (3188).

Shire Stallions, Foaled in 1904.

1st—Birdsall King (imp.) [478] (Vol. 28 E.), black, face and legs white, foaled 1904. Bred by Geo. Hill, Birdsall, York, Eng. Imported and exhibited by Hamilton & Hawthorne, Simcoe, Ont.; sire, Birdsall Caliph (21128); dam, Violet (43670), by Grafton 2nd (13120).

2nd—Admiral Togo [399] dark bay, stripe in face, hind legs white, foaled 1904. Bred by Morris & Wellington, Fonthill, Ont. Exhibited by John Gardhouse & Sons, Highfield, Ont.; sire, Mars (imp.) [275] (17103); dam, Moulton Mariana (imp.) [164], by Lockinge Harold (16779).

3rd—Whitewall Prince (imp.) [459] (22954), bay, white mark down face, white socks, except near fore leg, foaled 1904. Bred by Alfred A. Haley, Whitewall, Malton, Eng. Imported and exhibited by Thos. Irving, Winchester, Ont.; sire, King 3rd (19737); dam, Whitewall Daisy (46816), by Northwood (4593).

Shire Stallions, Foaled in 1905.

1st—Sir Ralph de Willington [465], bay, stripe, near fore foot white, foaled 1905. Bred by Morris & Wellington, Fonthill, Ont. Exhibited by T. D. Elliott, Bolton.; sire, Mars (imp.) [275] (17103); dam, Moulton Mariana (imp.) [164] (Vol. 24, E.), by Lockinge Harold (16779).

Shire Mares, Foaled on or Subsequent to Jan. 1st, 1904.

1st—Holdenby Nicausis (imp.) [276] (Vol. 28, E.), brown, white star, white hairs on nose and lip, both hind socks white, foaled 1904. Bred by Jno. Chambers & Sons, Holdenby, Northampton, Eng. Exhibited by J. Gardhouse & Sons, Highfield, Ont.; sire, Northgate Prince (15762); dam, Nicausis (33270), by Vulcan of Worsley 5th (12601).

Hackney Stallions 15 hands, 2 inches and over, Foaled Previous to January 1st, 1904.

1st—Baltimore (imp.)—332—(8729), Chestnut, stripe on face, four white legs, foaled 1903. Bred by T. D. Reed, Driffield, Eng. Imported and exhibited by Graham Bros., Claremont, Ont.; sire, Rosador (4964); dam, (6454) Calamine, by Lord Cave (2551).

2nd—Colorito (imp.)—333—(8796), chestnut, foaled 1902. Bred by H. G. Stacey Leeds, Eng. Imported and exhibited by Graham Bros., Claremont, Ont.; sire, Rosador (4964); dam, (11525) Syringa, by Agility (2799).

3rd—Scotch Hazel (imp.)—373—(9875), bay, foaled 1903. Bred by Jno. Iles, Dennick, King's Lynn, Norfolk, Eng. Imported and exhibited by O. Sorby, Guelph, Ont.; sire, Dairyman John (7769); dam, (10700) Bit o' Fashion, by Lord Donaghue (3743).

4th—Samuel Smiles (imp.)—303—(9005), chestnut, small star, white fore fetlocks, foaled 1902. Bred Jno. Beal, Blanch, North Dalton, Hull, Eng. Exhibited by J. B. Hogate, Weston, Ont.; sire, Blanch Squire (7711); dam, (15634) Blanch Primrose.

5th—Linden Renown (imp.)—331—(8545), bay, near hind foot white, foaled 1901. Bred by executors of late Thos. Wing, March, Eng. Imported and exhibited by Graham Bros., Claremont, Ont.; sire, Danegelt's son (6326); dam, (6109) Rosy Pink, by Renown (1887).

6th—British Yeoman (imp.)—251—(8085), dark brown, white near hind fetlock, foaled in 1900. Bred by Wm. Martin, Scoreby Grange, Yorkshire, Eng. Exhibited by T. H. Hassard, Millbrook, Ont.; sire, Pilot 2nd (3864); dam, (1040) Brown Bess.

7th—Gay Falconer (imp.)—347—(8859), chestnut, blaze, white near hind fetlock, foaled 1902. Bred by J. W. Simpson, Bootle, Eng. Exhibited by T. H. Hassard, Millbrook, Ont.; sire, Unique (4052); dam, (6416) Blush Rose, by Falcon (2470).

Hackney Stallions, Under 15 hands, 2 in., Foaled Previous to January 1st, 1904

1st—Dalton King (imp.)—338—(9592), bay, foaled 1901. Bred by Thos. Binnington, North Dalton, Eng. Imported and exhibited by Graham Bros., Claremont, Ont.; sire, Garton Duke of Connaught (3009) dam, (5790) May Queen.

2nd—Moordale Duke (imp.)— —(8955), chestnut, star, white fetlocks, foaled 1903. Bred by Edward Hollingworth, Moordale, Dobcross, Eng. Exhibited by W. H. Nichols, Hamilton, Ont.; sire, Garton Duke of Connaught (3009); dam, (9975) Gay Duchess, by Danegelt (174).

3rd—Terrington Activity (imp.)—Vol. 2—(9036), bay, foaled 1903. Bred by Sir Gilbert Greenall, Walton Hall, Warrington, Eng. Imported and exhibited by Graham Bros., Claremont, Ont.; sire, Lord Drewton 2nd (6817); dam, (13963) Terrington Accident, by Goldfinder 6th (1791).

4th—Forest Fashion (imp.)—344—(9228), brown, star and snip, four white fetlocks, foaled 1903. Bred by Wm. Rennison, Skiff Farm, Holme-on-Spalding, Yorks, Eng. Imported and exhibited by Hamilton & Hawthorne, Simcoe, Ont.; sire, Copley Gany (7028); dam, (15436) Skiff Nancy, by Forest King (5621).

5th—Tregarthon (imp.)—309—(8683), chestnut, foaled 1902. Bred by Alfred A. Haley, Whitewall, Malton, Eng. Imported and exhibited by Graham Bros., Claremont, Ont.; sire, Garton Duke of Connaught (3009); dam, (6346) Actress, by Danegelt (174).

6th—Blanch Surprise (imp.)—368—(8745), dark chestnut, white face, four white legs, foaled 1903. Bred by Jno. Beal, North Dalton, Driffield, Eng. Imported and exhibited by John A. Boag & Son, Ravenshoe, Ont.; sire, Rosador (4964); dam, (15634) Blanch Primrose, by Garton Duke of Connaught (3009).

7th—Sharplow (imp.)—359—(6557), brown, foaled in 1897. Bred by Sir Gilbert Greenall, Walton Hall, Eng. Exhibited by J. Gordon McPherson, V.S., Toronto; sire, Sir Horace (5402); dam, (3852) Georgina 3rd, by Sir George (778).

Hackney Stallions, Foaled in 1904.

1st—Crayke Mikado (imp.)—334—(9176), bay, star, white near fore fetlock, foaled 1904. Bred by Stephen Cliff, Western Flatts, Wortley, Leeds, Eng. Exhibited by Graham Bros., Claremont, Ont.; sire, Garton Duke of Connaught (3009); dam, (13533) Halsham Topsy, by Lord Derby 2nd (417).

2nd—King's Chocolate (imp.)—342—(9291), bay, litttle white on face, foaled 1904. Bred by T. & C. Ross, The Limes, Hedon, Hull, Eng. Imported and exhibited by Hamilton & Hawthorne, Simcoe, Ont.; sire, Chocolate Jr. (4185); dam, (10023) Her Majesty, by His Majesty (2513).

3rd—Terrington Cleophas (imp.)—335—(9460), chestnut, foaled 1904. Bred by Sir Gilbert Greenall, Walton Hall, Eng. Imported and exhibited by Graham Bros., Claremont, Ont.; sire, Clifton 3rd (6689); dam, (13980) Terrington Rachel, by Gentleman John (3624).

4th—Cedar Conquest (imp.)—349—(9155), chestnut, white face, white fore pasterns and hind legs, foaled 1904. Bred by Geo. Wilson, Cedar House, Garton, Driffield, Eng. Exhibited by T. H. Hassard, Millbrook, Ont.; sire, Conquest 2nd (5560); dam, (14216) Cedar Primrose, by Revival (7236).

Standard Bred Stallions, Trotters or Pacers, Foaled Previous to Jan. 1st, 1904. Conformation, Style of Travelling or gaits, breeding and Record to be specially considered.

1st—Arley A. 36329, bay, foaled 1900. Exhibited by Crow & Murray, Toronto; sire, Westbrook, 7501; dam, Jenny McGregor, by McGregor Boy, 2696.

2nd—Fritz Bingen, 37553, black, 15.2, foaled in 1901. Bred by J. Malcolm Forbes, Boston, Mass. Exhibited by Hugh Scott, Toronto; sire, Bingen, 79567; dam, Javotte, by Wilton, 5982.

Standard Bred Stallions, Trotters, Foaled Previous to Jan. 1st, 1904. Type and Build to Produce Carriage Horses, Carriage Horse conformation and gaits to be specially considered.

1st—Rex Edward, 40305, bay, foaled 1901. Exhibited by S. J. Patterson, Warkworth, Ont.; sire, Red Shawmut, 18247; dam, Helen Dean, by Pilot Medium, 1597.
2nd—Arley A. 36329, bay, foaled 1900. Exhibited by Crow & Murray, Toronto; sire, Westbrook, 7501; dam, Jenny McGregor, by McGregor Boy, 2696.
3rd—The Roman, 812, bay, foaled 1897. Exhibited by Paterson Bros., Coleman, Ont.; sire, Budd H., 676; dam, Charlotte S., by Oriole, 2297.

Thoroughbred Stallions, Foaled Previous to Jan. 1st, 1904.

1st—Cricklade, 368 (363), bay, foaled 1902. Exhibited by Crow & Murray, Toronto; sire, Lados; dam, Craig Crook; by Foxhall.
2nd—Kapanga Horse, chestnut, aged. Exhibited by Dr. Andrew Smith, Toronto; sire, Spendthrift (imp.); dam, Kapanga (imp.).

Thoroughbred Stallions, Foaled Previous to Jan. 1st, 1904. Type and Conformation to Produce Saddle and Hunting Horses to be specially considered.

1st—Halfling (imp.) (172), brown, foaled 1892. Exhibited by Thos. G. Paterson, Coleman, Ont.; sire, Macheath; dam Moiety, by Charibert.
2nd—Ben Carrick, 21093, golden bay, foaled 1899. Bred by George Headly, New York. Exhibited by Allan Kemp, Oakville; sire, Ben Strome; dam, Hanoletta.
3rd—Gold Car, chestnut, foaled 1898. Bred by J. B. Haggin. Exhibited by Cheyne & Armstrong, Derry West, Ont.; sire, Goldfinch (imp.); dam, Carina.
4th—Procession, bay, 16.1, foaled 1896. Exhibited by Wm. McKay, Doncaster, Ont.; sire, Order; dam, Triumph.
5th—Andy Williams, brown, foaled 1899. Exhibited by Chas. Verral, Toronto; sire, Kingstock; dam, Carmencita.

Thoroughbred Stallions, Foaled on or Subsequent to January 1st, 1904.

1st—Kelvin, 40018, brown, star in forehead, four white ankles, foaled April 27, 1904. Exhibited by T. Ambrose Woods, Toronto; sire Martinmas; dam, Nancy Lee.

Shetland Pony Stallions, any age.

1st—Goldfinder—Vol. 10—. Exhibited by F. Gillies, Toronto.
2nd—Lord Minto—5275—, Brown, foaled July 7, 1903. Bred by George Cassie Exhibited by F. D. Elliot, Toronto, sire, Vermont Dewey—5269—; dam, Nina—2700.

Shetland Pony Mares, any age.

1st—Nepsie, bay. Exhibited by Alfred Rogers, Deer Park.
2nd—Dolly, black. Exhibited by Langton Bros., Toronto.
3rd—Balmanno Queen—Vol. 15—. Exhibited by F. Gillies, Toronto.

Pony Stallions, any age, any breed other than Shetland, 14 hands, 1 inch and under.

1st—Sparks, bay. Exhibited by Graham Bros., Claremont, Ont.
2nd—Sharplow (imp.)—359—(6557). Exhibited by J. Gordon McPherson, V.S., Toronto.

Pony Mares, any age, any breed other than Shetland, 14 hands, 1 inch and under

1st—Lady Grey, grey, foaled 1900. Exhibited by H. M. Robinson, Toronto; sire, Royal Standard (imp.) —55— (3918).
2nd—Minnie, grey, foaled 1897. Exhibited by Sam Groves, Toronto.

Heavy Draught Geldings, or Mares, Shown in Harness, three years old and over, to be sired by either a Registered Clydesdale or Shire Stallion. Name and number of sire to be given with entry. Animals competing in other classes not eligible.

1st—Bobby Burns, bay gelding, 16.2, 7 years. Exhibited by the Dominion Transport Co., Toronto; sire, Macarlie [2464].
2nd—Sport, bay gelding, 16.3, 7 years. Exhibited by the Dominion Transport Co., Toronto; sire, Lord Charming [2264].

3rd—Charlie, bay gelding, 16.3, 6 years. Exhibited by the Dominion Transport Co., Toronto; sire, Royal Huntly (imp.) [2432].

4th—Tom, bay gelding. Exhibited by Jos. Russell, Toronto; sire, Baron Burgie, (imp.) [2723].

5th—Farmer, brown gelding. Exhibited by Jos. Russell, Toronto; sire, Baron Burgie (imp.) [2723].

6th—Prince Arthur, bay gelding, 16.2, 6 years. Exhibited by the Dominion Transport Co., Toronto; sire, Montrave Chief (imp.) [537].

Heavy Draught Team, in harness, geldings or mares, to be sired by a Registered Clydesdale or Shire. Name and number of sire to be given with entry.

1st—Bobby Burns, bay gelding, 16.2, 7 years; sire, Macarlie [2464]. Sport, bay gelding, 16.3, 7 years; sire, Lord Charming [2264]. Exhibited by the Dominion Transport Co., Toronto.

2nd—Bob, bay gelding; sire, Granite [1913]. Gamey, bay gelding; sire, Sir Arthur (imp.) [3154] (10455). Exhibited by Smith & Richardson, Columbus, Ont.

3rd—Charlie, bay gelding, 16.3, 6 years; sire, Royal Huntly (imp.) [2432].

Prince Arthur, bay gelding, 16.2, 6 years; sire, Montrave Chief (imp.) [537]. Exhibited by the Dominion Tranpsort Co., Toronto.

4th—Farmer, brown gelding; sire, Baron Burgie (imp.) [2723].

Tom, bay gelding; sire, Baron Burgie (imp.) [2723]. Exhibited by Jos. Russell, Toronto.

CHAMPIONSHIPS.

Clydesdale Stallion, any age.

1st—Baron Richardson (imp.) [5320] (12842). Exhibited by Smith & Richardson, Columbus.

Clydesdale Mare, any age.

1st—Fifeshire Lass (imp.) [9581] (Vol. 29, S.). Exhibited by Hodgkinson & Tisdale, Beaverton.

Shire Stallion, any age.

1st—Birdsall King (imp). [478] (Vol. 28, E.). Exhibited by Hamilton & Hawthorne, Simcoe, Ont.

Shire Mare, any age.

1st—Holdenby Nicausis (imp.) [276] (Vol. 28, E.). Exhibited by J. Gardhouse & Sons, Highfield, Ont.

Hackney Stallion, any age.

1st—Dalton King (imp.)—338—(9592). Exhibited by Graham Bros., Claremont, Ont.

Standard Bred Stallion, any age.

1st—Rex Edward, 40305. Exhibited by S. J. Patterson, Warkworth, Ont.

Thoroughbred stallion, any age.

1st—Halfling (imp.) (172). Exhibited by Thos. G. Paterson, Coleman, Ont.

Pony Stallion, any age.

1st—Sparks, bay. Exhibited by Graham Bros., Claremont, Ont.

Pony Mare, any age.

1st—Lady Grey, grey. Exhibited by H. M. Robinson, Toronto.

SPRING STALLION SHOWS, 1906.

RENFREW SPRING STALLION SHOW, APRIL 24.

Under the auspices of the Renfrew Agricultural Society.

Secretary,—W. E. Smallfield, Renfrew; total receipts, $32.40; total expenditure, $31.08; 20 horses on exhibition, all but 2 or 3 of which were registered. No prizes were offered, but a handsome badge was given to each entry.

HURON COUNTY SPRING STOCK EXHIBITION, APRIL 5.

Secretary, J. W. Shaw, M.D., Clinton; total receipts, $440; total expenditure, $411; entries, stallions, 23; other horses, 66; total, 89; prizes offered, $354. Prizes paid, stallions, $94; other horses, $95; other stock, $150; total paid, $339. Printed regulations require all stallions to be registered.

TOWNSHIP OF ERIN SPRING HORSE SHOW, APRIL 20.

Show held at Hillsburg.

Secretary, Peter McGill, Erin; total receipts, $281.78; total expenditure, $223.85; entries, stallions, 14; other horses, 56; total 70. Prizes offered, $246.00; prizes paid, stallions, $86; other classes, $100; total $186. Owners were required to produce registration certificates of stallions at the time of entry.

CHATHAM SPRING STALLION SHOW, APRIL 29.

Under the auspices of the West Kent Agricultural Society.

Secretary, A. H. White, Chatham; total receipts, $89.15; total expenditure, $28; entries, 31. The prizes consisted of ribbons, together with sweepstakes of $5 for best heavy horse and $5 for best light horse. Prizes were offered for registered horses.

KENILWORTH SPRING HORSE SHOW, APRIL 17.

Secretary.—Geo. Cushing, Kenilworth; total receipts, $205.15; total expenditure, $150.10; prizes offered, $179.00; prizes paid, stallions, $39; other horses, $55; other stock, $21; total, $115. Most of the stallions shown were registered.

ELMIRA SPRING HORSE SHOW, APRIL 19.

Held under the auspices of the Woolwich Agricultural Society.

Secretary, Harry W. Zilliax, Elmira; total receipts, $122.75; total expenditure, $122.25; entries, stallions, 18; other horses, 15; total, 33. Prizes offered, stallions, $90; other horses, $30; total, $120; prizes paid. $106. Winning stallions were pure-bred.

TARA SPRING SHOW, APRIL 20.

Secretary, Neil McDougall, Tara; total receipts, $158.80; total expenditure, $117.35; entries, 20; prizes offered, $88. Prizes paid, stallions, $62; other horses, $18; total $80.

GUELPH SPRING STALLION SHOW, APRIL 18.

Under the auspices of the South Wellington Agricultural Society.

Secretary, Wm. Laidlaw, Guelph; total receipts, $291.10; total expenditure, $234.80; entries, 42; prizes offered, $190; prizes paid, stallions, $106; other horses, $62; total $168. All stock was registered.

PALMERSTON SPRING STALLION SHOW, APRIL 10.

Secretary, R. J. Smith, Palmerston; total receipts, $101.75; total expenditure, $107.50; entries, 26; amount of prizes offered, $119. Prizes paid, stallions, $67; other horses, $26; total $93. All stallions were registered.

MALTON SPRING SHOW, APRIL 13.

Malton Stock Breeders' Association.

Secretary, Albert Hewson, Grahamsville; receipts, $149.75; expenditure $136.50; entries, 54; prizes offered, $123; prizes paid, $108. Unregistered stallions not barred from exhibiting.

SOUTH LANARK HORSE SHOW.

Held at Perth, under the auspices of the South Lanark Agricultural Society.

Secretary, J. A. Kerr, Perth; Date, May 1st; prizes offered, stallions $40; other horses, $75; total $115; prizes paid, stallions, $30; other horses, $62· total $92.

OWEN SOUND SPRING HORSE SHOW, APRIL 18.

Under the auspices of the North Grey Agricultural Society.

Secretary, John McQuaker, Owen Sound; gate receipts, $27.05; expenditures in addition to prize money, $10.00; entries, 22; prizes offered, $85.00; prizes paid, $85.00. All exhibitors were required to supply the judge with a certificate of registration.

SEAFORTH SPRING STOCK SHOW.

Under the auspices of the South Huron Agricultural Society.

Secretary, M. Y. McLean, Seaforth; Date, April 24th; gate receipts, $19.00; general expenses, $12.80; entries, 25; prizes paid, horses, $96; other stock, $37; total $133.00.

Regulation 5 of the rules and regulations is as follows: "Certificates of herd book pedigrees of pure bred bulls and thoroughbred horses must be lodged with the Secretary at the time of making entry."

In judging the horses there is no competition; all entries were inspected and any horses that passed inspection were paid a premium of $4; the object of the exhibition being to get the horses together so as to allow any person interested to make comparisons and selection.

CARLETON PLACE HORSE SHOW, APRIL 25.

Secretary, J. J. McGregor, V.S., Carleton place; date, April 25th; total receipts, $558.00; expenditure, in addition to prize money, $244.75; prizes paid, $110; prizes offered, stallions, $120; other horses, $153; total $273.

CANNINGTON HORSE SHOW, MAY 24.

Secretary, G. H. Woodward, Cannington; prizes offered, stallions, $45; other classes, $238; total, $283. No. of stallions entered, 5; prizes paid, stallions, $30; other classes, $233; total receipts, $327.80; total expenditure, $337.80.

ELORA ENTIRE HORSE SHOW, APRIL 20.

Secretary,—R. J. McQueen, Elora; receipts, collected to time of report, $204.25; expenditure, $152.75; prizes offered, $146.00; prizes paid, $139.00. All stallions with the exception of road horses were registered.

DRAYTON ENTIRE HORSE SHOW.

Secretary, Geo. M. Fox, Drayton; date, April 12th; entries, stallions, 19; other horses, 23; total 42. Prizes offered, $166.00; prizes paid, stallions, $110; other horses, $46; total $156.00; receipts, $168.00; expenditure, 171.78. All horses were registered, and the names and numbers supplied in all but one or two cases.

ST. THOMAS HORSE SHOW ASSOCIATION, SEPT. 16.

Secretary, M. Scarth Stevenson, St. Thomas; amount offered for stallions, $50.00; amount offered for other horses, $353.00.

TOWNSHIP OF COLLINGWOOD AGRICULTURAL SOCIETY SPRING HORSE SHOW, APRIL 27.

Secretary, Chas. Pye, Clarksburg; expenditures, $26; entries, 6; prizes offered, $25; prizes paid, $16.

SPRING STALLION SHOWS, 1907.

HELD BY SOCIETIES OTHER THAN AGRICULTURAL SOCIETIES.

HURON COUNTY SPRING STOCK SHOW, APRIL 12TH.

Show held at Clinton. Secretary, J. W. Shaw, M.D., Clinton. Total receipts, $499.53; total expenditures, $375.22. Prizes paid, horses, $170; other classes, $61; total paid, $231.

BRIGHT SPRING SHOW, APRIL 12TH.

Secretary, L. W. Craig, Bright. Total receipts, $92.00; total expenditures, $86.00. Prizes offered, $93.00; prizes paid, stallions, $48; other horses, $18; other stock, $11; total paid, $77

SUNNIDALE SPRING SHOW, APRIL 18TH.

Secretary, John A. Bell, New Lowell. Total expenditures, $80.70. Prizes offered, $82.00; prizes paid, stallions, $55.00; other stock, $10.00; total paid, $65.00. All animals shown to be eligible for registration.

MALTON SPRING SHOW, APRIL 5TH.

Secretary, Albert Hewson, Grahamsville. Total receipts, $158.00; total expenditures, $112.00. Entries, stallions, 5; other horses, 33; other stock, 3; total entries, 41. Prizes offered, $142; prizes paid, stallions, $24; other classes of horses, $62; other stock, $8; total prizes paid, $94.

CARLETON PLACE HORSE SHOW, JUNE 5TH.

Secretary, B. S. Snyder. Carleton Place. Total receipts, $652.68; total expenditures, $376.36. Entries, stallions, 7; other stock, 170. Prizes offered, $392; prizes paid, $101, and $185 in specials.

ERIN SPRING HORSE SHOW, APRIL 18TH.

Secretary, Peter McGill, Hillsburg. Total receipts, $331.78; total expenditures, $225.35. Entries, stallions, 14; other classes of horses, 79. Prizes offered, stallions, $132; other classes of horses, $113. Prizes paid, stallions, $99; other classes of horses, $109. Pedigrees of all stallions were required to be produced at time of entry.

ELORA ENTIRE HORSE SHOW, APRIL 12TH.

Secretary, R. J. McQueen, Elora. Total receipts, $312.50; total expenditures, $217.35. Entries, stallions, 21; other horses, 24. Prizes offered, stallions, $188; other horses, $35. Prizes paid, stallions, $140; other horses, $31.

DRAYTON ENTIRE HORSE SHOW, APRIL 11TH.

Secretary, Geo. M. Fox, Drayton. Total receipts, $154; total expenditures, $175. Entries, 32. Prizes offered, $171; prizes paid, $158. One of the rules required that pedigrees of all stallions must be handed to the Secretary.

CANNINGTON HORSE SHOW, MAY 24TH.

Secretary, G. H. Woodward, Cannington. Total receipts, $337.50; total expenditures, $375.10. Entries, stallions, 9; other horses, 41. Prizes offered, stallions, $45; other horses, $287. Prizes paid, stallions, $45; other horses, $254.

PALMERSTON HORSE SHOW, APRIL 12TH.

Secretary, R. J. Smith, Palmerston. Total receipts, $189.65; total expenditures, $157.40. Entries, stallions, 17; other horses, 16. Prizes offered, stallions, $103; other horses, $66. Prizes paid, stallions, $88; other horses, $51.

KENILWORTH SPRING SHOW, APRIL 18TH.

Secretary, Geo. Cushing, Kenilworth. Total receipts, $217.85; total expenditures, $162.50. Entries, stallions, 8; other horses, 50; other stock, 7. Prizes offered, stallions, $58; other horses, $103; other stock, $13. Prizes paid, stallions, $26; other horses, $95; other stock, $12.

CREEMORE SPRING SHOW, APRIL 23RD.

Secretary, A. H. Watson, Creemore. Total receipts, $114; total expenditures, $146.25. Entries, stallions, 8; other horses, 8; other stock, 11. Prizes offered, stallions, $40; other stock, $46. Prizes paid, stallions, $30; other stock, $46.

REPORTS OF LOCAL POULTRY ASSOCIATIONS.

THE CORNWALL POULTRY ASSOCIATION.

This Association was organized on November 14th, 1906. The membership for 1906 was 97. The receipts were $313.75, and the expenditures $292.39. A poultry show was held February 6th to 9th, 1907, at Cornwall, at which $250 was offered in prizes, $202.75 of this amount being won. There were 516 entries, and 535 birds on exhibition, including turkeys, geese and ducks. The entry fee was 25 cents. Mr. L. G. Jarvis of Montreal acted as judge. The Association intends holding another Show in 1908, by which they expect to still further improve the quality of the poultry in that section. The officers of the Association are: President, Thos. Flanigan; Vice-President, James Snetsinger; Secretary-Treasurer, Chas. LaRose.

LAMBTON COUNTY POULTRY ASSOCIATION.

The membership of this Association for 1907 is 43. Their first show was held at Inwood, January 29th to 31st, last, with entries numbering 390. Mr. Wm. McNeil was the judge. Their receipts for the year ending January, 1907, were $198.45, and expenditures, $198.44. The officers of the Association are: President, W. R. Dawson, Inwood; Vice-President, D. Hartley, Wyoming; Secretary-Treasurer, A. H. Graves, Inwood.

OWEN SOUND AND COUNTY OF GREY POULTRY ASSOCIATION.

The present membership of the Association is 220. A Show was held at Owen Sound, January 14th to 18th, 1907. Entries numbered 725, and the judges were Joseph Bennett and D. C. Trent. $800 was offered in prizes. The officers of the Association are: President, H. Mosley; Vice-President, G. J. Somerville; Secretary-Treasurer, Robert R. Cameron.

WATERLOO COUNTY POULTRY ASSOCIATION.

The membership of this Association for 1907 is 35. A show was held at Berlin, November 8th, 9th and 10th, 1906, the entries numbering 615. Mr. Jos. Bennett and Mr. Wm. McNeil acted as judges. $191.50 was paid in prizes. The total receipts of the Association for the year ending February, 1907, were $537.20, and the total expenditures $490.14. The officers of the Association are: President, J. Hallman; Vice-President, H. J. Hurd; Secretary-Treasurer, J. A. Good, Berlin.

ST. THOMAS POULTRY ASSOCIATION.

The 1907 membership of this Association is 33. A show was held January 10th to 12th, 1907, at which 510 birds were on exhibition. $141.25 was offered in regular prizes and $28.50 in special prizes. The judge was Richard Oke, London. The receipts of the Association amounted to $458.73, and the expenditures, $360.20. The officers of the Association for 1907 are: President, J. W. Roberts; Vice-President, T. H. Scott; Secretary-Treasurer, Wm. Cadman, St. Thomas.

MIDLAND POULTRY ASSOCIATION.

The membership of this Association in 1907 is 100. The last show was held February 8th, 9th and 10th, 1907, with 525 entries The amount of cash prizes offered was $300, of which $233.75 was won. Mr. J. Bennett of Toronto acted as judge. Receipts were $405.44, and expenditures $363.90. The officers of the Association for 1907 are: President, John W. Benson; Vice-President, H. S. Ruby; Secretary-Treasurer, H. E. Macartney, Midland.

MEAFORD POULTRY ASSOCIATION.

This Association was organized October 3rd, 1904, with the object of demonstrating the superiority of modern pure-breeding methods by holding a show each year. The fourth annual show was held January 2nd, 3rd and 4th, 1907, with 416 entries. $715 was offered in prizes, of which $252.04 was won. The judge was Mr. Newton Cosh. The membership of the Association for 1907 is 56. The receipts for the year ending December, 1906, are $328.29, and expenditures, $312.54. The officers of the Association are: President, Bryan Laycock; Vice-President, Wm. Croft; Secretary, E. S. Smith, Meaford.

NAPANEE POULTRY ASSOCIATION.

The membership of this Association for 1907 is 44. The second annual winter show was held January 9th to 12th, 1907, entries numbering 499. The amount of cash offered in prizes was $335.50, of which $293.50 was won. The judge was L. G. Jarvis, Montreal. The total receipts for the year ending June 30th, 1907, were $478.50, and the total expenditures, $498.40. The officers for 1907 are: President, Herman Meng; Vice-President, Geo. Degroff; Secretary, Geo. T. Walters, Napanee.

TORONTO POULTRY, PIGEON AND PET STOCK ASSOCIATION.

The present membership of this association is 98. The last show held was December 28th to 31st, 1906, and January 1st, 1907. There were 846 entries, and $247.61 was offered in prizes, all of which was won. The judges were J. E. Bennett, Wm. J. Wolfe and Wm. Barber. Receipts amounted to $718.22, and expenditures, $634.67. The officers are: President, J. E. Bennett; Vice-President, C. J. Mick; Secretary-Treasurer, Chester E. Sherlock, 7 Pearson Ave., Toronto.

HURON POULTRY ASSOCIATION.

The membership of this Association for 1907 is 50. The eleventh annual show was held at Seaforth, January 20th to 23rd, 1907, at which there were 451 entries. F. Scott of St. Thomas acted as judge. $127.65 was paid in prize money. The total receipts for the year ending January 31st, 1907, were $225.20, and the total expenditures $256.04. The following are the officers for 1907: President, P. Dill; Vice-President, Wm. Hortry; Secretary-Treasurer, J. F. Daly, Seaforth.

NORTHERN ONTARIO POULTRY AND PET STOCK ASSOCIATION.

The membership of this Association for 1907 is 30. The last show held by this Association was on November 29th and 30th, and December 1st, 1906, for which there were 230 entries. $500 was offered in prizes, and Messrs. Robert Coppey, Kingston, and Ernest A. Orr, Fort William, were judges The receipts for the year ending June 30th, 1907, were $279.45, and the expenditures $280.94. The officers are as follows for 1907: President, J. K. Ollis; Vice-President, John Bingham; Secretary-Treasurer, David Bell, Port Arthur.

HESPELER POULTRY AND PET STOCK ASSOCIATION.

The membership of this Association at present is 52. A show was held December 6th and 7th, 1906, for which there were 204 entries. The judge was Prof. W. R. Graham of Guelph. $27 was offered in prizes, and the total receipts were $110.30, and expenditures $75.23. The officers are: President, Thos. Traplin; Vice-President, W. A. Rife; Secretary, Geo. W. Tebbs, Hespeler; Treasurer, B. Thorne.

BRANTFORD POULTRY ASSOCIATION.

Membership for 1907, 36. Show of 1907 was held January 11th to 13th, with 875 entries. $432 was offered in prizes, of which $281.50 was won. The judges were Wm. McNeil and J. Bogue. The total receipts were $627.47, and the total expenditures, $468.50. The following are the officers for 1907: President, S. Schelly; Vice-President, W. Furguson; Secretary-Treasurer, P. McNelles.

INGERSOLL POULTRY ASSOCIATION.

This Association was organized in 1888, with the object of furthering the poultry industry. The average membership for the past five years was 100, and the membership for 1907, 110. Five shows have been held, the last one being held December 18th, 19th and 20th, 1906. There were 315 entries and $357 offered in prize money. Mr. Wm. McNeil of London acted as judge. The total receipts according to the financial statement were $208.34, and expenditures $233.02. The following are the officers of the Association: President, H. W. Partlo; 1st Vice-President, R. B. Hutt; 2nd Vice-President, J. McDermaid; Secretary-Treasurer, F. J. Fisher, Ingersoll.

HAMILTON AND WENTWORTH POULTRY ASSOCIATION.

There are 35 local members and 35 county members belonging to the above Association. A show was held December 1st to 6th, 1906, for which there were 860 entries made, and $475 offered in prize money. Messrs. Newton Cosh, Sharpe Butterfield and Chas. F. Wagner acted as judges. Owing to a street car strike being on at the time, the show was not the success it would otherwise have been. The total receipts and expenditures for the year ending March 1st, 1907, were $564.60 and $559.39 respectively. The officers are as follows: President, G. G. Henderson; 1st Vice-President, J. Meldrum, 2nd Vice-President, W. J. Roberts; Secretary-Treasurer, J. E. Peart.

LINDSAY POULTRY AND PET STOCK ASSOCIATION.

The membership of this Association for 1907 is 153. The show for the same year was held January 22nd to 24 inclusively. The entries numbered 792 and $750 was offered in prize money. Mr. D. C. Trew acted as judge. The total receipts were $615.43; expenditures $593.34. The officers are: President, Johnson Ellis; Vice-President, J. A. Williamson; Secretary-Treasurer, Crail A. Frost, Lindsay.

KINGSTON POULTRY ASSOCIATION.

This Association was organized February 16th, 1906. The object of the Association is to advance the breeding of thoroughbred stock in Kingston, not only for show, but for general purposes. With this end in view they have different breeds at the semimonthly meetings, to be scored and discussed. The average membership is 40, and the membership for 1907 is 45. The last show was held September 18th and 19th, 1907, with 229 entries. Ribbons were given for prizes. The judges were Col. R. E. Kent, G. S. Oldreive, and Geo. Nicol. The total receipts were $40, and total expenditures $37.80. The officers for 1907 are as follows: President, G. S. Oldreive; Vice-Presidents, W. H. Reid and P. D. Lyman; Secretary, R. M. Douglas; Treasurer, Thos. Ougston.

LEAMINGTON POULTRY ASSOCIATION.

This Association was organized February 4th, 1907. The object of the Association is to improve and encourage the breeding of thoroughbred poultry. They have worked heretofore with the Mersea, Leamington and South Gosfield Agricultural Society, and a show was held in connection with this Society on October 2nd, 3rd and 4th, 1907, at which there were 347 entries and $196 offered in prize money. Mr. Sharpe Butterfield acted as judge. The membership of the Association for 1907 is 20. The total receipts show $20, and the total expenditures $15.75. The officers for 1907 are as follows: President, Lewis Smith; Vice-President, Arthur Harrington; Treasurer, James Hambley; Secretary, J. R. Johnson, Leamington.

BROCKVILLE POULTRY AND PET STOCK ASSOCIATION.

The membership of this Association in 1907 is 34. No show was held, but $9.50 was given in prizes for poultry at the Fall Fair. The receipts of the Association for 1906 were $44.75, and expenditures $19.75. They purpose holding a show in 1907. The officers are: President, W. M. Osborne; Vice-President, E. McDougall; Secretary-Treasurer, W. P. Carswell.

GUELPH POULTRY ASSOCIATION.

The membership for 1907 is 70. A local show is held every Thanksgiving day by this Association, there being 120 entries at the show of 1906. Silk ribbons are given for prizes and no admission fee is charged. Mr. R. Oke acted as judge. This Association also contributes to the special prize list in connection with the poultry department of the Winter Fair. The receipts of the Association for the year ending January, 1907, were $145.65, and expenditures $145.65. The officers are as follows: President W. R. Graham; Vice-President, Wm. Krouse; Secretary, W. A. McMaster; Treasurer, G. Pool.

LONDON POULTRY ASSOCIATION.

The membership of the Association for 1907 is 108. No show is held by this Association, but about $366 was donated to the special prize list of the Provincial Winter Fair in 1906. Receipts for 1906 show $499.03, and expenditures $424.15. The officers are: President, Wm. McNeil; Vice-President, C. H. McNeil; Secretary, R. Oke; Treasurer, J. H. Saunders.

APPENDIX.

PRIZE WINNERS AT WINTER FAIR, GUELPH, 1906.

CATTLE.

SHORTHORNS.

Steer, 2 years and under 3. Three entries.

1st—Joseph Stone, Saintfield. Champion, Sept. 9, 1903. Sire, (————) 39466; dam (————), 65434.

2nd—John Brown & Sons, Galt. General White, Dec. 10, 1903. Sire, Crimson Victor, 40584; dam, Kate, 28335.

3rd—James Rennie & Sons, Blackwater. Crimson Prince, Sept. 9, 1903. Sire, Crimson Lad, 43523; dam, Dandy Lassie, 24728.

Steer, 1 year and under 2. Six entries.

1st—I. & A. Groff, Alma. King Edward, Nov. 4, 1904. Sire, Lucerne (imp.), 50053; dam, Rantin Flossie, Vol. 18.

2nd—John Brown & Sons. Ned, Jan. 1905. Sire, Crimson Ribbon, 40918; dam, Lady Pink, Vol. 15.

3rd—Jas. Rennie & Sons. King Edward, May, 31, 1905. Sire, Crimson Duke, 48960; dam, Idonia 3rd, 41390.

4th—G. & W. Parkinson, Eramosa. Prince, Jan. 1905. Sire, Golden Prince, 41108; dam, Alexandria, Vol. 19.

5th—Dan Wright, Ponsonby. Seraphina Prince, Nov. 30, 1904. Sire, Mayflower Lad, 40523; dam, Wright's Seraphina, 53647.

Steer under 1 year. Seven entries.

1st—H. Smith, Exeter. Allison, Sept. 2, 1905. Sire, Royal Stewart, 46037; dam, Miss Blake, 34327.

2nd—Alex. McKinnon, Coningsby. White Ribbon, Feb. 12, 1906. Sire, Crimson Ribbon, 40918; dam, Valman of Whitehouse, 57439.

3rd—W. R. Elliott & Sons, Guelph. White Star, Nov., 1905. Sire, Wanderer's Star, 48585; dam, Highland Mary, 65304.

4th—Kyle Bros., Ayr. White Heather, Dec., 1905. Sire, Bapton Chancellor, 40359; dam, Valentine, 36986.

5th—Andrew Richardson, Guelph. Frankie, Oct. 16, 1905. Sire, Scottish Marquis, 53228; dam, Snowball, 71830.

Cow or Heifer 3 years or over. Five entries.

1st—John Brown & Sons. Crystal Belle, Vol. 20, Sept. Sire, Captain May Fly, 28858; dam, Snowflake, 34929.

2nd—Geo. Amos & Son, Moffat. Martha 4th, Vol. 16, E.H.B., Nov. 3, 1899. Sire, Spicy King, 75717; dam, Martha 3rd (imp.).

3rd—John McNabb, Rockwood. Florence, 57498, Feb. 23, 1901. Sire, Charles Dickens, 23418; dam, Daisy Roy, 30499.

4th—E. Brien & Son, Ridgetown. Easter Gem, 54617, April 2, 1903. Sire, Diamond Chief, 39110; dam, Easter Lily, 44047.

Heifer 2 years and under 3. One entry.

G. & W. Parkinson. Gretchen, 75965, March 17, 1904.

Heifer under 2 years. Three entries.

1st—L. Parkinson, Eramosa. Rouena 2nd, 75871, Nov. 10, 1904. Sire, Prince Royal, 50275; dam, Fannie, 52237.

2nd—John McNabb. Minnie, 76072, Nov. 24, 1904. Sire, Viscount Chesterfield, 48625; dam, Minnie Roy, 28652.

3rd—Andrew D. Schmidt, Elmira. Miss Canada, 76090, Oct. 1, 1905. Sire, Imperial Crown, 57969; dam, Lucy, 68587.

Best Shorthorn Steer.

1st—I. & A. Groff, Alma.

HEREFORD AND ABERDEEN-ANGUS.

Steer or Heifer 2 years and under 3. Three entries.

1st—Jas. Bowman, Guelph. Elm Park Rosebud, 72545, June 16, 1904. Sire, Prince of Benton, 58632; dam, E. P. Belle 4th, 54035.

2nd—Samuel Young, Guelph. Black Boy, Sept., 1903. Sire, Oxford King, 24359; dam, Coleen of Springside, 555.

Steer or Heifer, 1 year and under 2. Seven entries.

1st—J. A. Govenlock, Forest. Pansy, 3903, Oct. 17, 1904. Sire, Imperial, 2034; dam, Julia, 1911.

2nd—H. McDougall, Guelph. Rosey Bright 2nd, 84622, Sept., 1904. Sire, Prince of Benton, 58632; dam, Rosey Bright, 40483.

3rd—R. J. Penhall, Nober. (————), Oct. 5, 1904. Sire, Corporal, 2405; dam, Merry Lass, 3033.

4th—J. A. Govenlock. Blossom 2nd, 4678, March 6, 1905. Sire, Imperial, 2034; dam, Blossom, 2097.

5th—John Lowe, Elora. Elm Park Beauty 2nd, 83323, Sept. 15, 1904. Sire, Prince of Benton, 58632; dam, The Belle of De Laval 2nd, 53459.

Steer or Heifer under 1 year. Four entries.

1st—James Bowman. Elm Park Beauty 3rd, 94697, Oct. 17, 1905. Sire, Elm Park Kaiser, 72537; dam, Belle De Laval 2nd, 53459.

2nd—John A. Govenlock. Little Beauty 2nd, 5569, Nov. 15, 1905. Sire, Imperial, 2034; dam, Little Beauty, 2099.

3rd—John Lowe. Middlebrook Pride, 96305, Nov. 12, 1905. Sire, Lord Val 2nd, 74188; dam, Elm Park Pride 2nd, 64286.

4th—The F. W. Stone Stock Co., Guelph. Sapphire, 224632, Oct. 26, 1905. Sire, Sparticus, 109829; dam, Peachstone C., 153846.

Cow or Heifer, 3 years or over. Five entries.

1st—The F. W. Stone Stock Co. Sweet Bar, 2418, 137,338, Jan. 20, 1902. Sire, Baronet (imp.) 1292, 100989; dam, Sweetheart 33rd, 100988.

2nd—James Bowman. Belle 4th, 54035, Sept. 14, 1901. Sire, Kyma's Heir, 24835; dam, Heather Belle, 22610.

3rd—J. A. Govenlock. Julia, 1911, Dec. 27, 1900. Sire, England (imp.), 1110; dam, Flossie, 1254.

4th—J. A. Govenlock. Forest Lady, 1437, April 5, 1899. Sire, Lambton's Pride, 912; dam, Delillah 3rd, 279.

5th—Samuel Young. Springside Bell, 55873, Feb. 3, 1902. Sire, Campbell of Tweedhill, 28216; dam, Addie Mc, 29313.

GALLOWAY AND DEVONS.

Steer or Heifer, 2 years and under 3. Two entries.

1st—C. C. Rudd, Eden Mills. Jake, March, 1904. Sire, Welsh Pete, 7349; dam, Ella, 1128.

2nd—D. McCrae, Guelph. Marion of Holme, 24798, Nov. 14, 1903. Sire, Midholme, 22684; dam, Molly of K., 16908.

Steer or Heifer, 1 year and under 2. Five entries.

1st—Robert Shaw, Brantford. Twin Beauty, 1428, Sept. 19, 1904. Sire, Viceroy of Castlemilk, 1394; dam, Minnie May of High Park, 1380.

2nd—Robert Shaw. Twin Billy, Sept. 19, 1904. Sire, Viceroy of Castlemilk, 1394; dam, Minnie May of High Park, 1380.

3rd—D. McCrae. Miss Mary A., 1409, Jan. 10, 1905. Sire, Cedric 4th of T., 1303; dam, Duchess 15th, 14853.

4th—C. C. Rudd. O. K., May, 1905. Sire, Welsh Pete, 7349; dam, Ruby 2nd, 1178.

5th—C. C. Rudd. Dora, 1188, Sept., 1904. Sire, Welsh Pete, 7349; dam, Florry, 1177.

Steer or Heifer under 1 year. Three entries.

1st—Robert Shaw. Moon Flower, 1424, Sept. 17, 1905. Sire, Viceroy ot Castlemilk, 1394; dam, Maud of High Park, 1375.

2nd—Robert Shaw. Sadie Mac, 1423, Sept. 11, 1905. Sire, Viceroy of Castlemilk, 1394; dam, Irvena, 1378.

3rd—D. McCrae. Nellie 15th, 1626, Jan. 3, 1906. Sire, Cedric 4th of T., 1303. dam, Nellie 12th of L., 16460.

Cow or Heifer 3 years and over. Two entries.

1st—C. C. Rudd. Ruby 2nd, 1178, Feb., 1901. Sire, Hero R., 1049; dam, Trilby, 1085.

2nd—D. McCrae. Lismore Lady, 1361, July 12, 1901. Sire, Gladstone Boy, 13879; dam, Lismore Lass, 12972.

GRADES OR CROSSES.

Steer, 2 years and under 3. Thirteen entries.

1st—Jas. Leask, Greenbank. Barnie, Nov., 1903. Sire, Moneyfuffel Knight, 43248.

2nd—Jas. Leask, Moneymaker, Nov., 1903. Sire, Moneyfuffel Knight, 43248.

3rd—Jas. Leask. Money Jack, Nov., 1903. Sire, Moneyfuffel Knight, 43248.

4th—Jas. Bowman. Cheltenham, Sept., 1903.

5th—Alex. McKinnon, Hillsburg. Baker, April 3, 1904. Sire, Clinker Jack, 54227.

Steer, 1 year and under 2. Five entries.

1st—I. & A. Groff. Victor's Favorite, Nov. 20, 1904. Sire, Victor's Roan Duke, 44322.

2nd—Jas. Leask. White Stewart, Jan., 1905. Sire, Admiral Chesterfield, 28911.

3rd—G. & W. Parkinson. Scotchman, Jan. 20, 1905. Sire, Royal Hope (imp.), 45222.

4th—John Brown & Sons. Scottie, Sept., 1904. Sire (————), 36806.

5th—Wm. G. Gerrie, Belwood. White Prince, Oct. 26, 1904. Sire, Marconi 4th (imp.), 50057.

Steer under 1 year. Seven entries.

1st—Jas. Leask. Gloster's 1st, Sept. 3, 1905.

2nd—Jas. Rennie & Sons. Royal Duke, March 3, 1906. Sire, Crimson Duke, 48960.

3rd—John Elliott, Marden. Paldro, Nov 20, 1905. Sire, Klondike of Bushy Farm, 52203.

4th—G. & J. P. Henderson, Guelph. Rosebank Lad, Jan. 6th, 1906. Sire, Elm Park King 2nd, 72542.

5th—Geo. Holmwood, Guelph. Billy, Nov. 27, 1905.

Cow or Heifer, 3 years or over. Two entries.

1st—Jas. Rennie & Sons. 2nd—John Brown & Sons.

Heifer, 2 years and under 3. Two entries.

1st—John Brown & Sons. Daisy.

Heifer under 2 years. Nine entries.

1st—Wm. G. Gerrie. Red Rose, Oct. 27, 1904. Sire, Marconi 4th (imp.), 50057.
2nd—Jas. Leask. Susan, March, 1905.
3rd—Peter Stewart, Everton. Roan Beauty, Sept. 20, 1904. Sire, Admiral Chesterfield, 28911.
4th—Hiram E. Alton, Everton. Lady, Sept. 8, 1904. Sire, College Hero.
5th—Jas. Rennie & Sons.

Three Export Steers. Six entries.

1st—John Brown & Sons.
2nd—Jas. Leask.
3rd—Joseph Stone, Saintfield.
4th—Jas. McCallum, Amulree.
5th—John Brown & Sons.

Grand Championship, Best Beef Animal.

1st—I. & A. Groff, Alma.

DRESSED CARCASSES.

Pure-Breds. Seven entries.

1st—C. C. Rudd, Jake (Devon).
2nd—L. Parkinson (Shorthorn).
3rd—W. R. Elliott & Sons, White Star (Shorthorn).
4th—Robert Shaw, Twin Billy (Galloway).

Grades or Crosses. Ten entries.

1st—Jas. Bowman, Guelph.
2nd—John Brown & Sons, Galt.
3rd—Jas. McCallum, Amulree.
4th—H. McDougall, Guelph.
5th—The F. W. Stone Stock Co., Guelph.

Best Pair Export Steers, Special. Open only to Exhibitors who have not won a prize in the Beef Cattle Dept. for 5 years previous to 1905.

1st—Jas. McCallum; 2nd—H. W. Ironside; 3rd—Jos. Stone.

Best Export Steer, Special.

1st—Jas. Leask, Greenbank.

Grade Steer or Heifer, Sired by Pure-bred Aberdeen-Angus Bull, Special.

1st—G. & J. Henderson; 2nd—John Brown & Sons; 3rd—Alex. McKinnon.

Steer or Heifer, Sired by Registered Hereford Bull, Special.

1st—J. A. Govenlock, Forest.

Grade Steer, Sired by Pure-Bred Shorthorn Bull, Special.

1st—I. & A. Groff; 2nd—Jas. Leask; 3rd—Jas. Leask.

Grade Steer or Heifer, fed in County of Wellington and owned by Exhibitor at least 5 months previous to Show.

1st—I. & A. Groff, Alma.

Steer or Heifer under 3 years, any breed, Grade or Cross, bred and fed by Exhibitor. Open only to Exhibitors who have not won a prize in Beef Cattle Department for six years previous to 1906, Special.

1st—Wm. G. Gerrie.
2nd—Alex. McKinnon.
3rd—L. Parkinson.
4th—Hiram E. Alton.

DAIRY TEST.

Name of Cow and Owner.	Lbs. of Milk.	% Fat.	Lbs. Fat.	Lbs. Solids, not Fat.	Points for Days in Milk.	Points for Fat.	Points for Solids not Fat.	Total Points.
Class 45, Section 1—Shorthorn Cow, 48 months and over—								
1st, Kentucky Queen, Jas. Brown, Norval	93.07	3.4	3.16	9.15	....	63.2	36.6	99.8
Class 45, Section 2—Shorthorn Cow, 36 months and under 48—								
2nd, D. of Bonnie Doon, L. D. Currie, Ospringe	79.44	2.8	2.22	7.47	1.5	44.4	29.88	75.78
Class 45, Section 3—Shorthorn Heifer, under 36 months—								
1st, Rose of Kentucky 34th, Jas. Brown, Norval	69.39	3.4	2.36	6.30	5.8	47.2	25.2	78.2
Class 46, Section 1—Ayrshire Cow, 48 months and over—								
1st, Sarah 2nd, H. & J. McKee, Norwich	100.87	4.2	4.24	9.46	....	84.8	37.84	122.64
2nd, Jean Armour, H. & J. McKee, Norwich	99.00	4.2	4.16	9.41	.4	83.2	37.64	121.24
3rd, Primrose of H. H., N. Dyment, Clappison	91.75	4.4	4.04	9.4	....	80.8	37.6	118.4
4th, Annie Laurie 2nd, H. & J. McKee, Norwich	95.69	3.8	3.64	8.99	1.1	72.8	35.96	109.86
Class 46, Section 2—Ayrshire Cow, 36 months and under 48—								
1st, Bonnie Jessie, W. M. Smith, Scotland	76.93	4.2	3.23	7.29	3.4	64.6	29.16	97.16
2nd, Scotch Lassie, W. M. Smith, Scotland	65.06	4.0	2.60	6.15	2.6	52.	24.6	79.2
Class 46, Section 3—Ayrshire Heifer, under 36 months—								
1st, Belle, A. E. Hulet, Norwich	77.2	4.6	3.55	7.74	....	71.	30.96	101.96
2nd, Old Ada's Last, H. & J. McKee, Norwich	67.13	3.8	2.55	6.55	.6	51.	26.2	77.8
3rd, Rosalie, N. Dyment, Clappison	68.45	3.8	2.6	6.33	....	52.	25.32	77.32
4th, Spottie, H. & J. McKee, Norwich	63.44	3.8	2.41	6.27	....	48.2	28.08	76.28
Class 47, Section 1—Holstein Cow, 48 months and over—								
1st, Tidy Pauline DeKol, H. Bollert, Cassel	131.06	3.4	4 46	12.52	....	89.2	50.08	139.28
2nd, Iosco DeKol, Geo. Rice, Tilsonburg	96.88	2.8	2.71	8.77	....	54.2	35.08	89.28
Class 47, Section 2—Holstein Cow, 36 months and under 48—								
1st, Madam B 4th, A. E. Hulet, Norwich	106.88	3.4	3.63	9.44	....	72.6	37.76	110.36
Class 47, Section 3—Holstein Heifer, under 36 months—								
1st, Tidy Pauline DeKol 2nd, H. Bollert, Cassel	73.36	4.0	2.93	6.9	10.	58.6	27.6	96.2
2nd, Starlight Calamity Countess, G. Rice, Tilsonburg	87.88	3.2	2.81	8.26	....	56.2	33.04	89.24
3rd, Daisy Texal Posch, G. Rice, Tilsonburg	95.93	2.6	2.49	8.33	....	49.8	33.32	83.12
Class 50, Section 1—Grade Cow, 48 months and over—								
2nd, Black Dinah, Geo. Rice, Tilsonburg	87.07	3.4	2.96	8.23	....	59.2	32.92	92.12

SHEEP.

COTSWOLDS.

Ewe under 1 year. Ten entries.

1st—Rawlings & Bailey, Forest. Rawlings 1046, 39354, Spring, 1906. Sire, Garne 56, 24808; dam, Rawling's 547, 23397.
2nd—E. Brien & Son, Ridgetown. Brien's 105, 40351, Spring, 1906. Sire, Snell's 882, 31988; dam, Law's 42, 26257.
3rd—Rawlings & Bailey. Rawling's 1180, 40558, Spring, 1906. Sire, Garne 56, 24808; dam, Rawling's 585, 25154.
4th—Rawlings & Bailey. Rawling's 1167, 40545, Spring, 1906. Sire, Garne 70, 24811; dam, Bailey's 47, 18447.
5th—E. Brien & Son. Brien's 107, 40352, Spring, 1906. Sire, Snell's 882, 31988; dam, Law's 42, 26257.

3 Ewes under 1 year. Three entries.

1st—Rawlings & Bailey; 2nd—E. Brien & Son; 3rd—Snell & Lyons, Norval.

Wether, 1 year and under 2. Six entries.

1st—E. Brien & Son. Brien's 101, Spring, 1905. Sire, Snell's 882, 31988; dam, Brien's 18, 22260.
2nd—Snell & Lyons. No. 847, Spring, 1905. Sire, Sanderson's King, 29588; dam. No. 964, 29743.
3rd—Rawlings & Bailey. Bailey 292, Spring, 1905. Sire, Garne 56, 24808; dam, Thomas 72, 24790.
4th—Snell & Lyons. No. 848, Spring, 1905. Sire, Sanderson's King 29588; dam, No. 964, 29743.
5th—E. Brien & Son. Brien's 102, Spring, 1905. Sire, Snell's 882, 31988; dam, Brien's 12, 22254.

Wether under 1 year. Eight entries.

1st—E. Brien & Son. Brien's 104, Spring, 1906. Sire, Snell's 882, 31988; dam, Brien's 27, 24749.
2nd—Rawlings & Bailey. Bailey 289, Spring, 1906. Sire, Garne 56, 24808; dam, Bailey 175, 28429.
3rd—Rawlings & Bailey. Bailey 290, Spring, 1906. Sire, Garne 56, 24808; dam, Bailey 175, 28429.
4th—E. Brien & Son. Brien's 106, Spring, 1906. Sire, Snell's 882, 31988; dam, Brien's 14, 22256.
5th—E. Brien & Son. Brien's 103, Spring, 1906. Sire, Snell's 882, 31988; dam, Brien's 27, 24749.

3 Wethers under 1 year. Three entries.

1st—E. Brien & Son; 2nd—Rawlings & Bailey; 3rd—Snell & Lyons.

Champion Wether under 2 years. Two entries.

1st—E. Brien & Son, Ridgetown.

COTSWOLD DRESSED CARCASSES.

Wether 1 year and under 2. Four entries.

1st, 2nd and 4th—E. Brien & Son; 3rd—Rawlings & Bailey.

Wether under 1 year. Four entries.

1st—Rawlings & Bailey, Forest.
2nd—E. Brien & Son, Ridgetown.
3rd—Rawlings & Bailey, Forest.
4th—E. Brien & Son, Ridgetown

LINCOLNS.

Ewe under 1 year. Six entries.

1st—J. T. Gibson, Denfield. Gibson's 365, 14560, 1906. Sire, Dean's 4, 11963; dam, Gibson, 60, 8543.

2nd—L. Parkinson, Eramosa. Parkinson's 496, 14928, 1906. Sire, Dudding's 326, 11153; dam, Duffields 13, 7334.

3rd—L. Parkinson. Parkinson's 497, 14927, 1906. Sire, Mitchell's 150, 13435, dam, Ruth 13, 9355.

4th—J. T. Gibson. Gibson's 367, 14562, 1906. Sire, Dean's 4, 11963; dam, Gibson's 190, 11234.

5th—L. Parkinson. Dainty, 15026, 1906. Sire, Captain 7, 13733; dam, Lovely 7, 10214.

3 Ewes under 1 year. Three entries.

1st—J. T. Gibson; 2nd—L. Parkinson; 3rd—L. Parkinson

Wether 1 year and under 2. Five entries.

1st—L. Parkinson. Parkinson 489, 14925, 1905. Sire, Gibson's 48, 8531, dam, Parkinson's 198, 8248.

2nd—J. T. Gibson. Gibson's 293, 13360, 1905. Sire, Pear's 361, 10905; dam, Annie S., 4872.

3rd—J. T. Gibson. Gibson's 289, 13364, 1905. Sire, Pear's 361, 10905; dam, D. C's No. 6, 6419.

4th—L. Parkinson. Fred, 14924, 1905. Sire, Charlton's 67, 9852; dam, Parkinson's 203, 8253.

Wether under 1 year. Six entries.

1st—J. T. Gibson. Gibson's 373, 15407, 1906. Sire, Pear's 361, 10905; dam, Gibson's 70, 9317.

2nd—J. T. Gibson. Gibson's 372, 15405, 1906. Sire, Pear's 361, 10905; dam, Gibson's 70, 9317.

3rd—J. T. Gibson. Gibson's 371, 15403, 1906. Sire, Pear's 361, 10905; dam, Gibson's 105, 9979.

4th—L. Parkinson. Parkinson 493, 1906. Sire, Charlton's 67, 9852; dam, Parkinson's 215, 9018.

5th—L. Parkinson. Parkinson 494, 1906. Sire, Charlton 67, 9852; dam, Parkinson 208, 9011.

3 Wethers under 1 year. Three entries.

1st—J. T. Gibson; 2nd—L. Parkinson; 3rd—L. Parkinson.

Champion Wether under 2 years.

1st—L. Parkinson, Eramosa.

LINCOLN DRESSED CARCASSES.

Wether, 1 year and under 2. Three entries.

1st—L. Parkinson; 2nd—J. T. Gibson; 3rd—L. Parkinson.

Wether under 1 year. Three entries.

1st—L. Parkinson; 2nd—J. T. Gibson; 3rd—L. Parkinson.

LEICESTERS.

Ewe under 1 year. Seventeen entries.

1st—John Kelly Shakespeare. Kelly's 600, 9599, 1906. Sire, Kelly's Dan Patch, 7577; dam, Miss DeWitt, 4911.

2nd—Hastings Bros., Crosshill. Miss Stanley H., 9447, 1906. Sire, Sam, 7924; dam, Lady Hill 3rd, 6631.

3rd—Oliver Turnbull, Walton. Rose Turnbull, 9878, 1906. Sire, B. 10, 4654; dam, Snell's Ewe, 108, 4961.

4th—Frank Kelly, Aylmer. Lady Aylmer, 9854, 1906. Sire, Aylmer Boy, 7683; dam, Hoggard's Polly No. 6, 6745.

5th—Oliver Turnbull. Min. Turnbull, 9877, 1906. Sire, B. 10, 4654; dam, Ramsays 1st, 6473.

3 Ewes under 1 year. Four entries.

1st—Hastings Bros., Crosshill.
2nd—Oliver Turnbull, Walton.
3rd—G. & W. Parkinson, Eramosa.
4th—Frank Kelly, Aylmer.

Wether, 1 year and under 2. Seven entries.

1st—Hastings Bros. George Hastings, 8667, March, 1905. Sire, Thompson's George, 7198; dam, Lady Hill 3rd, 6631.

2nd—A. & W. Whitelaw, Guelph. (————), March, 1905. Sire, Jerry No. 4, 7605; dam, Daisy of Guelph 5th, 6017.

3rd—G. & W. Parkinson. Boyd, April, 1905. Sire, Jerry 4, 7605; dam, Muriel Boyd 5th, 4206.

4th—Hastings Bros. International King, 8666, March, 1905. Sire, Thompson's George, 7198; dam, Lady Hill 3rd, 6631.

5th—Hastings Bros. Saxon, 8670, April, 1905. Sire, Thompson's George, 7198; dam, Pauline, 6628.

Wether under 1 year. Eleven entries.

1st—John Kelly. Rob, 1906. Sire, Kelly's Dan Patch, 7577; dam, Kelly's Pride, 4905.

2nd—Hastings Bros. Trixey, 9932, 1906. Sire, Sam, 7924; dam, Isabel, 7865.

3rd—Frank Kelly. No. 1, 1906. Sire, (————); dam, Kelly No. 8, 5866.

4th—A. & W. Whitelaw. (————), 1906. Sire, Remus, 5980; dam, Lily of Guelph 3rd, 6738.

5th—G. & W. Parkinson. Boyd No. 39, 1906. Sire, Jerry No. 4, 7605; dam, Muriel Boyd 8th, 5302.

3 Wethers under 1 year. Four entries.

1st—Hastings Bros., Crosshill.
2nd—Frank Kelly, Aylmer.
3rd—G. & W. Parkinson, Eramosa.
4th—A. & W. Whitelaw, Guelph.

Champion Wether under 2 years.

1st—Hastings Bros., Crosshill.

LEICESTER DRESSED CARCASSES.

Wether 1 year and under 2. Five entries.

1st—Hastings Bros., Crosshill.
2nd—G. & W. Parkinson, Eramosa.
3rd—Oliver Turnbull, Walton.
4th—A. & W. Whitelaw, Guelph.
5th—Hastings Bros., Crosshill.

Wether under 1 year. Three entries.

1st—A. & W. Whitelaw; 2nd—Frank Kelly; 3rd—Hastings Bros.

OXFORDS.

Ewe under 1 year. Nine entries.

1st—J. W. Lee & Sons, Simcoe. Lee's Ewe 120, 38242, 1906. Sire, Kelmscotian 82, 30521; dam, Hilton Bell 3rd, 25687.

2nd—J. W. Lee & Sons. Lee's Ewe 118, 38240, 1906. Sire, Kelmscotian 82, 30521; dam, Hilton Prinnie 3rd, 25683.

3rd—W. Brien & Sons, Ridgetown. W. Brien 61, 39229, 1906. Sire, Snobelin 10, 32692; dam, Ridgetown Pride 2nd, 33121.

4th—J. W. Lee & Sons. Lee's Ewe 124, 38246, 1906. Sire, Kelmscotian 82, 30521; dam, Sweet Briar 2nd, 27647.

5th—W. Brien & Sons. W. Brien 62, 39230, 1906. Sire, Snobelin 10, 32692; dam, Ridgetown Pride 3rd, 33122.

Three Ewes under 1 year. Three entries.

1st—J. W. Lee & Sons; 2nd—W. Brien & Sons; 3rd—A. Stevenson, Atwood.

Wether, 1 year and under 2. Five entries.

1st—W. E. Wright, Glanworth. Summerhill King, 35715, 1905.
2nd—W. E. Wright. Culross 80, of 1905, 37663, 1905.
3rd—W. Brien & Sons, Ridgetown. W. Brien 90, 1905. Sire Snobelin 10, 32692; dam, Brien's Nellie, 27339.
4th—W. Brien & Sons. W. Brien 91, 1905. Sire, Snobelin 10, 32692; dam, Brien's Lilian, 27342.
5th—W. Brien & Sons. W. Brien 92, 1905. Sire, Snobelin 10, 32692; dam, Brien's Alice, 27351.

Wether under 1 year. Eight entries.

1st—W. E. Wright. Wright's 590, 37671, 1906. Sire, Mapleton King 300, 36838; dam, St. Anne's 170, 27705.
2nd—A. Stevenson. Stevenson's 62, 39161, 1906. Sire, Springbank Jupiter, 1653; dam, Cousin's 160, 25613.
3rd—A. Stevenson. Stevenson's 68, 39156, 1906. Sire, Springbank Jupiter, 1653; dam, Cousin's 207, 28944.
4th—W. E. Wright. Adonis, 113, 39217, 1906. Sire, Reading 10th, 18550; dam, Teeswater Lady, 108, 29483.
5th—A. Stevenson. Stevenson's 70, 38158, 1906. Sire, Springbank Jupiter, 1653; dam, Cousin's 300, 32593.

Three Wethers under 1 year. Three entries.

1st—A. Stevenson; 2nd—W. E. Wright.

Champion Wether, under 2 years.

1st—W. E. Wright, Glanworth.

OXFORD DRESSED CARCASSES.

Wether, 1 year and under 2. Five entries.

1st—W. E. Wright, Glanworth; 2nd—W. E. Wright, Glanworth.

Wether under 1 year. Four entries.

1st—W. E. Wright, Glanworth.
2nd—A. Stevenson, Atwood.
3rd—A. Stevenson, Atwood.
4th—W. E. Wright, Glanworth.

SHROPSHIRES.

Ewe under 1 year. Ten entries.

1st—John Campbell, Woodville. Campbell's 1469, 235768, 1906.
2nd—John Campbell. Campbell's 1481, 235770, Spring, 1906.
3rd—W. H. Beattie, Wilton Grove. Robinson's 198, 236237, April, 1906.
4th—W. H. Beattie. Robinson's 199, 236238, May, 1906.

Three Ewes under 1 year. Five entries.

1st—W. H. Beattie.
2nd—Lloyd-Jones Bros., Burford.
3rd—Abram Rudell, Hespeler.
4th—W. D. Monkman, Bond Head.

Wether, 1 year and under 2. Six entries.

1st—John Campbell. Guardian, 218089, Spring, 1905.
2nd—John Campbell. Mariposa Jubilee, 222184, Spring, 1905.
3rd—W. E. Wright. Wright's 530, 220538, 1905.
4th—Abram Rudell. Rudell 355, 238034, 1905.
5th—A. G. Luxton, Milton West. Graham's 5, 222896, 1905.

Wether under 1 year. Ten entries.

1st—John Campbell. Adamant, 236893, Spring, 1906.
2nd—John Campbell. Fair Star, 236912, Spring, 1906.
3rd—W. E. Wright. MacPherson's 98, 236395, 1906.
4th—John Campbell. McKague's 67, 236902, Spring, 1906.
5th—Lloyd-Jones Bros. L. J. 513, 240682, 1906.

Three Wethers under 1 year. Four entries.

1st—John Campbell, Woodville.
2nd—Lloyd-Jones Bros., Burford.
3rd—W. E. Wright, Glanworth.
4th—W. H. Beattie, Wilton Grove.

Champion Wether under 2 years.

1st—John Campbell, Woodville.

SHROPSHIRE, DRESSED CARCASSES.

Wether 1 year and under 2. Four entries.

1st—A. G. H. Luxton; 2nd—W. E. Wright; 3rd—Abram Rudell.

Wether under 1 year. Seven entries.

1st—Lloyd-Jones Bros., Burford.
2nd—John Campbell, Woodville.
3rd—Abram Rudell, Hespeler.
4th—W. E. Wright, Glanworth.
5th—W. H. Beattie, Wilton Grove.

SOUTHDOWNS.

Ewe under 1 year. Eleven entries.

1st—Sir George Drummond, Beaconsfield. Drummond Ewe, 1103, 20769, 1906. Sire, Sandringham, 32, 16401; dam, Drummond E., 649, 17027.

2nd—Sir George Drummond. Drummond Ewe, 1136, 20770, 1906. Sire, Sandringham 32, 16401; dam, Drummond E., 364, 14308.

3rd—Telfer Bros., Paris. Telfer's Ewe, 162, 20762, 1906. Sire, St. Alban's King, 18489; dam, Simenton Ewe, 13498.

4th—Telfer Bros. Telfer Ewe, 163, 20763, 1906. Sire, St. Alban's King, 18489; dam, Telfer Ewe, 11051.

5th—Sir George Drummond. Drummond's Ewe, 1097, 20768, 1906. Sire, Stetcharoth Conqueror, 18601; dam, Drummond E., 716, 17046.

Three Ewes under 1 year. Four entries.

1st—Sir Geo. Drummond.
2nd—Telfer Bros., Paris.
3rd—John Jackson & Son, Abingdon.
4th—Geo. Baker, Simcoe.

Wether, 1 year and under 2. Eleven entries.

1st—Sir Geo. Drummond. Drummond Wether 974, 19874, 1905. Sire, Sandringham, 32, 16401; dam, Drummond E. 447, 15476.

2nd—Telfer Bros. (————), 21143, 1905. Sire, Babraham Hodge, 17471; dam, Mc Ewe, 14080.

3rd—John Jackson & Son. Jackson 9, 1905. Sire, Babraham Example, 17513; dam, Jackson's Ewe, 41 C., 17484.

4th—Telfer Bros. Martin Wether, 19902, 1905. Sire, Chichester King, 16994; dam, Martin Ewe, 16701.

5th—Telfer Bros. Telfer Wether, 19860, 1905. Sire, St. Alban's King, 18489; dam, Simenton Ewe, 13498.

Wether under 1 year. Eleven entries.

1st—Sir Geo. Drummond. Drummond's Wether 1074, 21066, 1906. Sire, Stetcharoth Conqueror, 18601; dam, Drummond E. 925, 19029.

2nd—Telfer Bros. Telfer 17, 21124, 1906. Sire, St. Alban's King, 18489; dam, Simenton Ewe 220, 17881.

3rd—Sir Geo. Drummond. Drummond's Wether 1079, 21067, 1906. Sire, Stetcharoth Conqueror, 18601; dam, Drummond E. 915, 19503.
4th—Telfer Bros. Telfer 18, 21125, 1906. Sire, St. Alban's King, 18489; dam, Jackson Ewe 13, 15566.
5th—Telfer Bros. Telfer 19, 21126, 1906. Sire, St. Alban's King, 18489; dam, Jackson Ewe 109, 14347.

3 Wethers under 1 year. Four entries.

1st—Sir George Drummond, Beaconsfield, Que.
2nd.—Telfer Bros., Paris, Ont.
3rd—Sir George Drummond, Beaconsfield, Que.
4th—John Jackson & Son, Abingdon.

Champion Wether under 2 years.

1st—Sir George Drummond, Beaconsfield, Que.

SOUTHDOWN DRESSED CARCASSES.

Wether, 1 year and under 2. Five entries.

1st—John Jackson & Son, Abingdon.
2nd—Robert McEwen, Byron.
3rd—Telfer Bros., Paris.
4th—Robert McEwen, Byron.

Wether, under 1 year. Two entries.

1st—Telfer Bros.; 2nd—John Jackson & Son.

DORSETS.

Ewe under 1 year. Five entries.

1st—R. H. Harding, Thorndale. Harding 39C., 5457, Feb., 1906. Sire, Tranquility 1365, 4530; dam, Lily, 1686.
2nd—R. H. Harding. Harding 38C., 5460, Feb., 1906. Sire, Tranquility 1365, 4530; dam, Mapleview's Best, 3256.
3rd—R. H. Harding. Harding 41C., 5461, March, 1906. Sire, Tranquility 1365, 4530; dam, Lena, 4594.
4th—John Hunter, Wyoming. Hunter 103, 5535, Dec., 1905. Sire, Jake, 3363; dam, Flora, 1265.
5th—John Hunter. Hunter 105, 5537, March, 1906. Sire, Jake, 3363, dam, Hunter 36, 2857.

Wether 1 year and under 2. Eight entries.

1st—R. H. Harding. Dick 3rd, 4897, May, 1905. Sire, Bartlett's Best, 9204; dam, McLee's 50, 2829.
2nd—Hastings Bros, Crosshill.
3rd—John Hunter. No. 4, 4892, April, 1905. Sire, Jake, 3363; dam, Hunter 43, 3368.
4th—R. H. Harding. Patsy, 4918, March, 1905. Sire, Tranquility 1365, 2083; dam, Perfection 3, 1787.
5th—John Hunter. No. 5, 4893, April, 1905. Sire, Jake, 3363; dam, Hunter 43, 3368.

Wether under 1 year. Eight entries.

1st—R. H. Harding. Harding 34C., 5454, March, 1906. Sire, Tranquility 1365, 4530; dam, Annie Laurie, 3451.
2nd—R. H. Harding. Lulu's First, 5866, April, 1906. Sire, Tranquility 1365, 4530; dam, Lulu, 4593.
3rd—Hastings Bros., Crosshill.
4th—R. H. Harding. Harding 26C., 5455, March, 1906. Sire, Tranquility 1365, 4530; dam, Charlotte, 329.
5th—John Hunter. Wattie, April, 1906. Sire, Jake, 3363; dam, Hunter 42, 3367.

Three Wethers under 1 year. Three entries.

1st—R. H. Harding; 2nd—R. H. Harding; 3rd—John Hunter.

Champion Wether under 2 years.

1st—R. H. Harding, Thorndale, Ont.

Dorset Dressed Carcasses.

Wether 1 year and under 2. Seven entries.

1st—R. H. Harding, Thorndale, Ont.
2nd—R. H. Harding, Thorndale, Ont.
3rd—John Hunter, Wyoming, Ont.
4th—John Hunter, Wyoming, Ont.
5th—John Hunter, Wyoming, Ont.

Wether under 1 year. Five entries.

1st—R. H. Harding, Thorndale, Ont.
2nd—John Hunter, Wyoming, Ont.
3rd—R. H. Harding, Thorndale, Ont.
4th—John Hunter, Wyoming, Ont.

Hampshires or Suffolks.

Ewe under 1 year. Four entries.

1st—John Kelly, Shakespeare. Kelly's 35, 13419, 1906. Sire, Hillhurst 269, 4352; dam, Etty, 7218.

2nd—Telfer Bros. Telfer Ewe 34, 13102, 1906. Sire, Warrior, 4430; dam, Telfer Ewe, 9405.

3rd—John Kelly. Kelly's 32, 13422, 1906. Sire, Alfred, 4957; dam, Cochran's 319, 10419.

4th—John Kelly. Kelly's 34, 13420, 1906. Sire, Alfred, 4957; dam Cochran's 285, 10434.

Wether 1 year and under 2. Four entries.

1st—Telfer Bros. W. 5801, March, 1905. Sire, Warrior, 3501; dam, Telfer, 9061.

2nd—John Kelly. Black Bill, Feb., 1905. Sire, High Clear Beagle, 3877; dam, B. P., 5405.

3rd—Telfer Bros. W. 5287, March, 1905. Sire, Warrior, 3501; dam, Telfer, 9062.

4th—John Kelly. Black Pete, June, 1905. Sire, Hillhurst 269, 4352; dam, Cochran's 319, 10419.

Wether under 1 year. Two entries.

1st—Telfer Bros. Buster Brown, March, 1906. Sire, Warrior, 4430; dam, Telfer, 10683.

2nd—John Kelly. Black Tom, March, 1906. Sire, Alfred, 4957; dam, Cochrane 296, 10426.

Champion Wether under 2 years.

1st—Telfer Bros., Paris, Ont.

Hampshire or Suffolk Dressed Carcasses.

Wether 1 year and under 2. Two entries.

1st—John Kelly, Shakespeare; 2nd—Telfer Bros., Paris.

Wether under 1 year. One entry.

1st—Telfer Bros., Paris, Ont.

Grades or Crosses, Sired by a Ram of a Long Wooled Breed.

Wether, 1 year and under 2. Nine entries.

1st—J. T. Gibson, Denfield.
2nd—J. T. Gibson, Denfield.
3rd—L. Parkinson, Eramosa.
4th—Hastings Bros., Crosshill.
5th—L. Parkinson, Eramosa.

Wether under 1 year. Fifteen entries.

1st—J. T. Gibson, Denfield.
2nd—L. Parkinson, Eramosa.
3rd—J. T. Gibson, Denfield.
4th—E. Brien & Son, Ridgetown.
5th—E. Brien & Son, Ridgetown.

Three Wethers under 1 year. Six entries.

1st—J. T. Gibson, Denfield.
2nd—L. Parkinson, Eramosa.
3rd—E. Brien & Son, Ridgetown.
4th—W. D. Monkman, Bond Head.

Champion Wether under 2 years.

1st—J. T. Gibson, Denfield.

Long Wooled Grade or Cross Dressed Carcasses.

Wether, 1 year and under 2. Six entries.

1st—E. Brien & Son, Ridgetown.
2nd—L. Parkinson, Eramosa.
3rd—L. Parkinson, Eramosa.
4th—J. T. Gibson, Denfield.
5th—Hastings Bros., Crosshill.

Wether under 1 year. Nine entries.

1st—Abram Rudell, Hespeler.
2nd—W. D. Monkman, Bond Head.
3rd—Hastings Bros., Crosshill.
4th—Oliver Turnbull, Walton.
5th—E. Brien & Son, Ridgetown.

Grades or Crosses, Sired by a Ram of a Short Wooled Breed.

Wether, 1 year and under 2. Six entries.

1st—Abram Rudell, Hespeler.
2nd—John Campbell, Woodville.
3rd—Lloyd-Jones Bros., Burford.
4th—John Campbell, Woodville.
5th—John Kelly, Shakespeare.

Wether under 1 year. Eleven entries.

1st—John Campbell, Woodville.
2nd—John Campbell, Woodville.
3rd—John Campbell, Woodville.
4th—W. E. Wright, Glanworth.
5th—Lloyd-Jones Bros., Burford.

Three Wethers under 1 year. Six entries.

1st—John Campbell; 2nd—W. E. Wright; 3rd—Lloyd-Jones Bros.

Champion Wether under 2 years.

1st—Abram Rudell, Hespeler.

Short Wooled, Grade or Cross, Dressed Carcasses.

Wether, 1 year and under 2. Three entries.

1st—Abram Rudell; 2nd—Lloyd-Jones Bros.; 3rd—Abram Rudell.

Wether under 1 year. Ten entries.

1st—John Campbell, Woodville.
2nd—A. G. H. Luxton, Milton West.
3rd—W. E. Wright, Glanworth.
4th—Abram Rudell, Hespeler.
5th—Abram Rudell, Hespeler.

Pen of four Lambs, Pure-Bred, Grade or Cross. Special.

1st—Sir George Drummond, Beaconsfield, Que.

Fat Sheep, Bred and Owned by Resident of Wellington County. Special.

1st—L. Parkinson, Eramosa; 2nd—A. & W. Whitelaw, Guelph.

Pen of Three Leicester Ewe Lambs. Special.

1st—Oliver Turnbull, Walton; 2nd—John Barr, Blyth.

OXFORD-DOWN, SPECIAL PRIZES.

Yearling Wether.

1st—W. E. Wright, Glanworth; 2nd—W. E. Wright, Glanworth.

Lamb Wether.

1st—W. E. Wright; 2nd—A. Stevenson; 3rd—A. Stevenson.

Pen of Three Wether Lambs.

1st—A. Stevenson, Atwood; 2nd—W. E. Wright, Glanworth.

SHROPSHIRE SPECIAL PRIZES.

Pure-bred Wether, 1 year and under 2.

1st—John Campbell; 2nd—John Campbell; 3rd—W. E. Wright.

Pure-bred Wether under 1 year.

1st—John Campbell; 2nd—John Campbell; 3rd—W. E. Wright.

Pen of Three Pure-bred Wethers under 1 year.

1st—John Campbell; 2nd—Lloyd-Jones Bros.; 3rd—W. E. Wright.

Grade Wether, 1 year and under 2, sired by a Registered Shropshire Ram.

1st—A. Rudell; 2nd—John Campbell; 3rd—Lloyd-Jones Bros.

Grade Wether, under 1 year, sired by a Registered Shropshire Ram.

1st—John Campbell, Woodville; 2nd—J. Campbell; 3rd—J. Campbell.

SOUTHDOWN SPECIAL PRIZES.

Ewe under 1 year.

1st and 2nd—Sir George Drummond, Beaconsfield, Que.; 3rd—Telfer Bros., Paris.

Pen of Three Ewes under 1 year.

1st—Sir George Drummond; 2nd—Telfer Bros.; 3rd—John Jackson & Son.

Pen of Three Ewe Lambs, under 1 year, bred by Exhibitor, get of one Ram.

1st—Telfer Bros.; 2nd—John Jackson & Son; 3rd—Geo. Baker, Simcoe.

Wether, 1 year and under 2.

1st—Sir Geo. Drummond; 2nd—Telfer Bros.; 3rd—Jno. Jackson & Son.

Wether under 1 year.

1st—Sir Geo. Drummond; 2nd—Telfer Bros.; 3rd—Sir Geo. Drummond.

Pen of Three Wethers under 1 year.

1st—Sir Geo. Drummond; 2nd—Telfer Bros.; 3rd—Sir Geo. Drummond.

SWINE.

BERKSHIRES.

Barrow, 6 months and under 9. Nine entries.

1st—John Kelly, Long Joe; sire, Concord Dick, 13912; dam, Shakespeare Belle, 13685.

2nd—E. Brien & Son, Long Tom; sire, Sunnyside Victor, 12470; dam, Perfection, 9156.

3rd—John Kelly, Long Tom; sire, Concord Dick, 13912; dam, Shakespeare Belle, 13685.

4th—E. Brien & Son, Long Tom 2nd; sire, Sunnyside Victor, 12470; dam, Perfection, 9156.

5th—W. W. Brownridge, Ashgrove, Harry; sire, Maple Lodge Harry 4th, 16156; dam, Maple Lodge Lizzie 10th, 16157.

6th—W. W. Brownridge, Harlow; sire, Maple Lodge Harry 4th, 16156; dam, Maple Lodge Lizzie 10th, 16157.

Barrow, under 6 months. Fourteen entries.

1st—John S. Cowan, Donegal, Fairview Royal; sire, Just the Thing, 13566; dam, Fairview Rose, 13727.

2nd—W. W. Brownridge, Leader; sire, Willow Lodge Leader, 11941; dam, Ashgrove Maid, 16521.

3rd—E. Brien & Son, Long Tom 4th; sire, Sunnyside Victor, 12470; dam, Bonnie Lady, 12213.

4th—John Boyes, Jr., Churchill, (————); sire, Maple Lodge Doctor 3rd, 14974; dam, Concord Madam, 13839.

5th—John S. Cowan, Fairview Royal 2nd; sire, Just the Thing, 13566; dam, Fairview Rose, 13727.

6th—John Kelly, Jim; sire, Dragoon 2nd (imp.), 14037; dam, Shakespeare Queen, 13170.

Sow, 9 months and under 15. Five entries.

1st—John Boyes, Jr., Concord Pride, 16561; sire, Snelgrove Jack, 14128; dam, Concord Gipsy, 13177.

2nd—John S. Cowan, Fairview Queen, 17025; sire, Just the Thing, 13566; dam, Rose Bud, 12518.

3rd—E. Brien & Son, Princess, 16828; Fashion's Hero, 6294; dam, Willow Lodge Minnie, 16356.

4th—E. Brien & Son, Prudence, 16987; sire, Fashion's Hero, 6294; dam, Willow Lodge Minnie, 16356.

Sow, 6 months and under 9. Eighteen entries.

1st—John Boyes, Jr., Rosebank Girl 3rd, 16981; sire, Maple Lodge Doctor 3rd, 14974; dam, Rosebank Girl 2nd, 14201.

2nd—John Boyes, Jr., Rosebank Girl 4th, 16982; sire, Maple Lodge Doctor 3rd, 14974; dam, Rosebank Girl 2nd, 14201.

3rd—John S. Cowan, Fairview Chance, 17078; sire, Just the Thing, 13566; dam, Fairview Primrose, 12509.

4th—John S. Cowan, Fairview Beauty, 17079; sire, Just the Thing, 13566; dam, Fairview Primrose, 12509.

5th—Robert Hyslop, Brantford, Polly, 16932; sire, Durham's De Clerc 41st, 15329; dam, Lady Brant 2nd, 14821.

6th—Robert Hyslop, Susy, 16933; sire, Durham's De Clerc 41st, 15329; dam, Lady Brant 2nd, 14821.

Sow, under 6 months. Twenty entries.

1st—John S. Cowan, Fairview Lassie, 17026; sire, Just the Thing, 13566; dam, Fairview Rose, 13727.

2nd—W. W. Brownridge, Pine Grove Maid, 17034.

3rd—W. W. Brownridge, Pine Grove Maid 2nd, 17036.

4th—John Boyes, Jr., Rosebank Lily 5th, 16978; sire, Maple Lodge Doctor 3rd, 14974; dam, Rosebank Lily 4th, 15654.

5th—John Boyes, Jr., Rosebank Lily 6th, 16979; sire, Maple Lodge Doctor 3rd, 14974; dam, Rosebank Lily 4th, 15654.

6th—W. W. Brownridge, Pine Grove Maid 3rd, 17037.

Three pigs, offspring of one sow, bred by exhibitor. Eleven entries.

1st—John Boyes, Jr., Churchill.
2nd—John S. Cowan, Donegal.
3rd—John Kelly, Shakespeare.
4th—W. W. Brownridge, Ashgrove.

YORKSHIRES.

Barrow, 6 months and under 9. Six entries.

1st—R. F. Duck & Son, Port Credit, King Edward 1st; sire, Oak Lodge Metchley 20th, 13125; dam, Lakeview Queen 3rd, 15912.

2nd—R. F. Duck & Son, King Edward 2nd; sire, Oak Lodge Metchley 20th, 13125; dam, Lakeview Queen 3rd, 15912.

3rd—J. Featherston & Son, Streetsville, Pine Grove Rufford 6th; sire, Dalmeny Joe (imp.), 13577; dam, Pine Grove Rufford Belle. 18858.

4th—J. Featherston & Son, Pine Grove Rufford 7th; sire, Dalmeny Joe (imp.), 13577; dam, Pine Grove Rufford Belle, 18858.

5th—Charles Currie, Morriston, Sam; sire, Morriston General, 18131; dam, Morriston Lassie. 17753.

6th—R. F. Duck & Son, King Edward 3rd; sire. Oak Lodge Metchley 20th, 13125; dam, Lakeview Queen 3rd, 15912.

Barrow, under 6 months. Ten entries.

1st—J. E. Brethour, Burford, (—————); sire, Oak Lodge Cid 8th, 18322; dam, Oak Lodge Pride 116th. 20950.

2nd—R. F. Duck & Son. Pioneer; sire, Oak Lodge Pharos 3rd, 11885; dam, Lake View Polly 16011.

3rd—J. E. Brethour, (————); sire, Oak Lodge Cid 8th, 18322; dam, Oak Lodge Pride 116th, 20950.

4th—James Wilson & Sons, Fergus, Second; sire, Canadian Duke, 14705; dam, Monkland Annie 3rd, 19216.

5th—J. Featherston & Son, Pine Grove Dalmeny; sire, Dalmeny Joe (imp.), 13577; dam, Pine Grove Missabella 3rd, 17778.

6th—J Featherston & Son, Pine Grove Dalmeny 2nd; sire, Dalmeny Joe (imp.), 13577; dam, Pine Grove Missabella 3rd, 17778.

Sow, 9 months and under 15. Eight entries.

1st—James Wilson & Sons, Monkland Belle 10th, 19897; sire, Canadian Duke, 14705; dam, Monkland Betty, 13399.

2nd—H. S. McDiarmid, Fingal, Summer Hill Jane 9th, 21360; sire, S. H. Cotsgrave Duke of York 3rd (imp.), 14769; dam, S. H. Dalmeny. 9100.

3rd—J. Featherston & Son, Pine Grove Misabella 6th, 18318; sire, Summerhill Botterford, 11323; dam, Pine Grove Misabella, 13756.

4th—J. Featherston & Son, Pine Grove Misabella 8th, 18319; sire, Summerhill Botterford, 11323; dam, Pine Grove Misabella 2nd, 13757.

5th—J. Featherston & Son, Pine Grove Dalmeny Jess 3rd, 19930; sire, Dalmeny Joe (imp.), 13577; dam, Pine Grove Fame 6th. 11098.

6th—R. F. Duck & Son, Lakeview Susie 2nd, 21339; sire, Oak Lodge Metchley 20th, 13125; dam, Lakeview Queen 3rd, 15912.

Sow, 6 months and under 9. Fourteen entries.

1st—H. S. McDiarmid, Maple Grove Mary, 20563; sire, S. H. Choice Goods (imp. in dam), 16096; dam, S. H. Dalmeny Duchess 60th (imp.), 16761.

2nd—J. Featherston & Son, Pine Grove Fame 12th, 19940; sire, Dalmeny Joe (imp.), 13577; dam, Pine Grove Fame 11th, 15952.

3rd—R. F. Duck & Son, Lakeview Minnie, 21336; sire, Oak Lodge Metchley 20th, 13125; dam, Lakeview Queen 3rd, 15912.

4th—James Wilson & Sons, Monkland Jessie 14th, 19928; sire, Canadian Duke, 14705; dam, Monkland Jessie 2nd, 15386.

5th—J. Featherston & Son, Pine Grove Rufford Belle 5th, 21377; sire, Dalmeny Joe (imp.), 13577; dam, Pine Grove Rufford Bell, 17604.

6th—R. F. Duck & Son, Lakeview Minnie 2nd, 21337; sire, Oak Lodge Metchley 20th, 13125; dam, Lakeview Queen 3rd, 15912.

Sow under 6 months. Thirteen entries.

1st—R. F. Duck & Son, Lakeview Maiden, 21342; sire, Oak Lodge Pharos 3rd, 11885; dam, Lake View Lily, 13595.

2nd—Herman Koelln, Glen Allan, River View Biddy, 21344; sire, Oak Lodge Pharos 3rd, 11885; dam, L. V. Jessie, 17965.

3rd—James Wilson & Sons, Monkland Annie 6th, 21369; sire, Canadian Duke, 14705; dam, Monkland Annie 3rd, 19216.

4th—J. Featherston & Son, Pine Grove Misabella 13th, 21379; sire, Dalmeny Joe (imp.), 13577; dam, Pine Grove Missabella 3rd, 17778.

5th—J. Featherston & Son, Pine Grove Misabella 14th, 21380; sire, Dalmeny Joe (imp.), 13577; dam, Pine Grove Misabella 3rd, 17778.

6th—R. F. Duck & Son, Lakeview Annie, 21335; sire, Oak Lodge Pharos 3rd, 11885; dam, Lakeview Polly, 16011.

Three pigs, the offspring of one sow, bred by exhibitor. Five entries.

1st—James Wilson & Sons; 2nd—R. F. Duck & Son; 3rd—J. Featherston & Son.

TAMWORTHS.

Barrow, 6 months and under 9. Five entries.

1st—D. Douglas & Sons, Mitchell, Bacon Bill; sire, Troy Boy, 2792; dam, Dina, 3061.

2nd—D. Douglas & Sons, Darwin; sire, Troy Boy, 2792; dam, Blue Bell, 4023.

3rd—Wm. Elliott, Galt, Englewood King; sire, Englewood Butler 3rd, 4830; dam, Roberta, 2511.

4th—Charles Currie, Morriston, Tom; sire, Newcastle Choice, 3415; dam, Morriston Madam, 4355.

5th—Charles Currie, Harry; sire, Newcastle Choice, 3415; dam, Morriston Madam, 4355.

Barrow, under 6 months. Nine entries.

1st—D. Douglas & Sons, Rex; sire, Hector, 3900; dam, Susie, 3066.

2nd—Charles Currie, Dick; sire, Newcastle Choice, 3415; dam, Thrifty Pink, 3871.

3rd, Charles Currie, Jim; sire, Newcastle Choice, 3415; dam, Thrifty Pink, 3871.

4th—D. Douglas & Sons, Maplehurst Choice; sire, Hector, 3900; dam, Susie, 3066.

5th—D. Douglas & Sons, Maplehurst Superior; sire, Hector, 3900; dam, Susie, 3066.

6th—Wm. Elliott, Englewood's Prince; sire, Englewood Butler 3rd, 4830; dam, Englewood Gem 7th, 4831.

Sow, 9 months and under 15. Seven entries.

1st—D. Douglas & Sons, Maplehurst Dora, 4857; sire, Troy Boy, 2792; dam, Blue Bell, 4023.

2nd—D. Douglas & Sons, Maplehurst Maud, 4858; sire, Troy Boy, 2792; dam, Blue Bell, 4023.

3rd—Charles Currie, Kate, 4873; sire, Newcastle Choice, 3415; dam, Thrifty Pink, 3871.

4th—Wm. Elliott, Englewood Gem 9th, 4835; sire, Englewood Prince, 3674; dam, Roberta, 2511.

5th—D. Douglas & Sons, Queen Ideal, 4859; sire, Troy Boy, 2792; dam, Blue Bell, 4023.

6th—Charles Currie, Cassie, 4874; sire, Newcastle Choice, 3415; dam, Hamilton Lass, 3099.

Sow, 6 months and under 9. Eight entries.

1st—D. Douglas & Sons, Irene, 4860; sire, Troy Boy, 2792; dam, Dina, 3061.

2nd—D. Douglas & Sons, Maplehurst Mina, 4861; sire, Troy Boy, 2792; dam, Dina, 3061.

3rd—D. Douglas & Sons, Ideal Queen, 4862; sire, Troy Boy, 2792; dam, Dina, 3061.

4th—Charles Currie, Flora, 4878; sire, Newcastle Choice, 3415; dam, Highland Lassie, 3102.

5th—Wm. Elliott, Englewood's Gem 10th, 4836; sire, Englewood's Prince, 3674; dam, Roberta, 2511.

6th—Charles Currie, Fannie, 4877; sire, Newcastle Choice, 3415; dam, Highland Lassie, 3102.

Sow under 6 months. Eight entries.

1st—D. Douglas & Sons, Edith, 4854; sire, Hector, 3900; dam, Susie, 3066.

2nd—Charles Currie, Minnie, 4876; sire, Newcastle Choice, 3415; dam, Thrifty Pink, 3871.

3rd—Wm. Elliott, Englewood Gem 8th, 4834; sire, Englewood Butler 3rd, 4830; dam, Englewood Gem 7th, 4831.

4th—D. Douglas & Sons, Georgina, 4855; sire, Hector, 3900; dam, Susie, 3066.

5th—Charles Currie, Madge, 4872; sire, Newcastle Choice, 3415; dam, Thrifty Pink, 3871.

6th—Charles Currie, Mollie. 4875; sire, Newcastle Choice, 3415; dam, Thrifty Pink, 3871.

Three pigs, the offspring of one sow, bred by exhibitor. Five entries.

1st—D. Douglas & Sons; 2nd—D. Douglas & Sons; 3rd—Charles Currie.

Chester Whites.

Barrow, 6 months and under 9. Six entries.

1st—George Bennett, Charing Cross, (————); sire, Lord Straton, 1315; dam, Bacon Type, 3235.

2nd—George Bennett, (————); sire, Lord Straton, 1315; dam, Bacon Type, 3235.

3rd—Daniel DeCourcy, Bornholm, (————); sire, Thorndale Enterprise, 2484; dam. Long Mag, 2126.

4th—Daniel DeCourcy, (————); sire, Thorndale Enterprise, 2484; dam, Long Mag, 2126.

5th—George Bennett, (————); sire, Lord Straton, 1315; dam, Bacon Type, 3235.

Barrow, under 6 months. Six entries.

1st—Daniel DeCourcy, (————); sire, Thorndale Enterprise, 2484; dam, Long Mag, 2126.

2nd—Daniel DeCourcy, (————); sire, Thorndale Enterprise, 2484; dam, Long Mag, 2126.

3rd—George Bennett. (————); sire, Lord Straton, 1315; dam, Jessie, 2057.

4th—W. E. Wright, Jack; sire, Cedar Grove King, 2713; dam, Daisy, 2856 .

5th—George Bennett, (————); sire, Lord Straton, 1315; dam, Jessie, 2057.

Sow, 9 months and under 15. Four entries.

1st—W. E. Wright, Glanworth Belle, 4134; sire, Cedar Grove King, 2713; dam, Daisy, 2856.

2nd—Daniel DeCourcy, Logan Lass 1st, 3907; sire, Thorndale Enterprise, 2484; dam, Long Mag, 2126.

3rd—George Bennett, Fairy, 1466; sire, Lord Straton, 1315; dam. Bacon Type, 3235.

4th—Daniel DeCourcy, Logan Lass 2nd, 3908; sire, Thorndale Enterprise, 2484; dam, Long Mag, 2126.

Sow, 6 months and under 9. Seven entries.

1st—Daniel DeCourcy, Nancy 1st, 3911; sire, Thorndale Enterprise, 2484; dam, Long Mag, 2126

2nd—George Bennett, Rosette, 1463; sire, Lord Straton. 1315; dam, Bacon Type, 3235.

3rd—George Bennett, Zelma, 1465; sire, Lord Straton, 1315; dam, Bacon Type, 3235.

4th—Daniel DeCourcy, Nancy 2nd, 3912; sire, Thorndale Enterprise, 2484; dam, Long Mag, 2126.

5th—W. E. Wright, Daisy 2nd, 4136; sire, Cedar Grove King, 2713; dam, Dot. 3455.

Sow, under 6 months. Six entries.

1st—Daniel DeCourcy (————), 3930; sire, King Edward, 3368; dam, Long Mag, 3519.

2nd—George Bennett, White Rose, 1460; sire, Lord Straton, 1315; dam, Jessie, 2057.

3rd—George Bennett, Lily Dale, 1461; sire, Lord Straton, 1315; dam, Jessie, 2057.

4th—Daniel DeCourcy (————), 3931; sire, King Edward, 3368; dam, Long Mag, 3519.

5th—W. E. Wright, Ruby, 4133; sire, Cedar Grove King, 2713; dam, Daisy, 2856.

Three pigs, the offspring of one sow, bred by exhibitor. Three entries.

1st—Daniel DeCourcy, Bornholm. 2nd—George Bennett, Charing Cross.

Any other Breed, Grade or Cross.

Barrow, 6 months and under 9. Eleven enrties.

1st—E. Brien & Son, Ridgetown.
2nd—Herman Koelln, Glen Allan.
3rd—D. Douglas & Sons, Mitchell.
4th—Herman Koelln, Glen Allan.
5th—J. Featherston & Son.
6th—J. Featherston & Son.

Barrow, under 6 months. Twelve entries.

1st—D. Douglas & Sons, Mitchell.
2nd—Charles Currie, Morriston.
3rd—Alfred E. Hulet, Norwich.
4th—J. Featherston & Son.
5th—E. Brien & Son.
6th—Daniel DeCourcy.

Sow, 6 months and under 9. Eleven entries.

1st—J. Featherston & Son.
2nd—D. Douglas & Sons.
3rd—J. Featherston & Son.
4th—Daniel DeCourcy.
5th—E. Brien & Son.
6th—Herman Koelln.

Sow, under 6 months. Ten entries.

1st—W. W. Brownridge, Ashgrove.
2nd—Snell & Lyons, Norval.
3rd—John S. Cowan, Donegal.
4th—D. Douglas & Sons.
5th—J. Featherston & Son.
6th—J. Featherston & Son.

Bacon Hogs.

Two Pure-breds. Thirty-one entries.

1st—R. F. Duck & Son, Port Credit.
2nd—R. F. Duck & Son, Port Credit.
3rd—J. E. Brethour, Burford.
4th—J. E. Brethour, Burford.
5th—James Wilson & Sons, Fergus.
6th—Herman Koelln, Glen Allan.
7th—J. Featherston & Son, Streetsville.
8th—D. Douglas & Sons, Mitchell.
9th—J. E. Brethour, Burford.
10th—James Wilson & Sons, Fergus.
11th—Harmon Stuart, Burford.

Two Grades or Crosses. Seventeen entries.

1st—Charles Currie, Morriston.
2nd—J. Featherston & Son, Streetsville.
3rd—R. F. Duck & Son, Port Credit.
4th—D. Douglas & Sons, Mitchell.
5th—E. Brien & Son, Ridgetown.
6th—Herman Koelln, Glen Allan.
7th—Alfred E. Hulet, Norwich.

Export Bacon Hogs, Two Best, alive.

1st—R. F. Duck & Son, Port Credit.

Two Pure-bred Bacon Hogs, Dressed Carcasses. Twenty-five entries.

1st—R. F. Duck & Son, Port Credit.
2nd—J. E. Brethour, Burford.
3rd—J. Featherston & Son, Streetsville.
4th—Harmon Stuart, Burford.
5th—James Wilson & Sons, Fergus.
6th—J. E. Brethour, Burford.
7th—J. Featherston & Son, Streetsville.
8th—J. Featherston & Son, Streetsville
9th—J. E. Brethour, Burford.

Two Grade or Cross-bred Bacon Hogs, Dressed Carcasses. Sixteen entries.

1st—Charles Currie, Morriston.
2nd—E. Brien & Son, Ridgetown.
3rd—J. Featherston & Son, Streetsville.
4th—Charles Currie, Morriston.
5th—Richard Houston, Dixie.
6th—Herman Koelln, Glen Allan.
7th—J. Featherston & Son, Streetsville.

Dressed Carcasses, Bacon Hogs, Two Best.

1st—Charles Currie, Morriston.

JUDGING COMPETITION.

Beef Cattle.—*Forty-three entries.*

1st—J. L. James, O.A.C., Guelph.
2nd—W. S. Jacobs, O.A.C., Guelph.
3rd—H. Sirrett, O.A.C., Guelph.
4th—D. Stewart, O.A.C., Guelph.
5th—H. F. Hudson, O.A.C., Guelph.
6th—H. C. Wheeler, O.A.C., Guelph.
7th—H. W. Scott, O.A.C., Guelph.
8th—R. L. Moorehouse, O.A.C., Guelph
9th—F. E. Millen, O.A.C., Guelph.
10th—R. N. Bray, O.A.C., Guelph.

Dairy Cattle.—*Twenty-nine entries.*

1st—R. L. Moorehouse, O.A.C., Guelph
2nd—Geo. R. Bell, Glanford.
3rd—W. E. Palmer, O.A.C., Guelph.
4th—P. E. Angle, O.A.C., Guelph.
5th—A. G. Turney, O.A.C., Guelph.
6th—R. J. Allen, O.A.C., Guelph.
7th—N. M. Ballantyne, O.A.C., Guelph
8th—D. T. Bell, O.A.C., Guelph.
9th—W. C. Owen, O.A.C., Guelph.
10th—R. W. Hodson, O.A.C., Guelph.

Sheep.—*Twenty-four entries.*

1st—H. C. Duff, O.A.C., Guelph.
2nd—C. F. McEwan, O.A.C., Guelph.
3rd—J. A. Telfer, Paris.
4th—David H. Kelly, Shakespeare.
5th—Geo. R. Bell, Glanford.
6th—J. L. James, O.A.C., Guelph.
7th—W. A. Barnet, O.A.C., Guelph.
8th—H. C. Wheeler, O.A.C., Guelph.
9th—D. Stewart, O.A.C., Guelph.
10th—W. S. Jacobs, O.A.C., Guelph.

Swine.—*Thirty-three entries.*

1st—R. W. Mills, O.A.C., Guelph.
2nd—F. H. Walker, O.A.C., Guelph.
3rd—R. W. Hodson, O.A.C., Guelph.
4th—J. W. Brownridge, O.A.C., Guelph.
5th—E. L. Hodgins, O.A.C., Guelph.
6th—P. E. Angle, O.A.C., Guelph.
7th—A. McLaren, O.A.C., Guelph.
8th—W. E. J. Edwards, O.A.C., Guelph.
9th—G. C. Syme, O.A.C., Guelph.
10th—M. F. Coglon, O.A.C., Guelph.

SEED DEPARTMENT.

Fall Wheat.—*Five entries.*

1st—Walter Hartman, Clarksburg.
2nd—Geo. Baker, Simcoe.
3rd—C. R. Gies, Heidelberg.
4th—Thomas B. Lush, Oustic.

Spring Wheat.—*Two entries.*

1st—Walter Hartman, Clarksburg.

Goose Wheat.—*Three entries.*

1st—A. R. Wood, Fergus; 2nd—Thomas B. Lush; 3rd—Albert Lush, Eramosa.

White Oats.—*Six entries.*

1st—Walter Hartman; 2nd—Thomas B. Lush; 3rd—A. R. Wood.

Black Oats.—*Three entries.*

1st—Thos. B. Lush; 2nd—Albert Lush; 3rd—W. M. Smith, Scotland.

Barley (Six-rowed).—*Four entries.*

1st—W. M. Smith, Scotland; 2nd—Walter Harman, Clarksburg.

Field Peas (Small).—*Two entries.*

1st—W. M. Smith, Scotland; 2nd—Thos. B. Lush, Oustic.

RED CLOVER.—*One entry.*

1st—Frank Kelly, Aylmer.

ALSIKE.—*Two entries.*

1st—Frank Kelly, Aylmer; 2nd—W. M. Smith, Scotland.

TIMOTHY.—*One entry.*

1st—Walter Hartman, Clarksburg.

CORN, FLINT IN THE EAR.—*Five entries.*

1st—Leonard D. Hankinson, Grovesend; 2nd—Geo. A. Bennett & Sons, Carlisle; 3rd—W. J. Campbell, Snelgrove.

CORN, DENT IN THE EAR.—*Twelve entries.*

1st—A. H. Woodbridge, Kingsville.
2nd—G. W. Coatsworth & Son, Kingsville.
3rd—J. A. Hicks, Essex.
4th—Joseph C. Thomas, Blytheswood.

POTATOES, LONG WHITE TYPE.—*Three entries.*

1st—W. M. Smith, Scotland.
2nd—C. R. Gies, Heidelburg.
3rd—C. R. Gies, Heidelburg.

POTATOES, ROUND WHITE TYPE.—*Three entries.*

1st—F. W. Krouse, Guelph; 2nd—W. M. Smith, Scotland.

SPECIAL PRIZES OF THE CANADIAN SEED GROWERS' ASSOCIATION.

FALL WHEAT (hand selected seed of first and second years).—*Two entries.*

1st—W. M. Smith, Scotland.

FALL WHEAT, GROUP EXHIBITS.—*One entry.*

1st—C. R. Gies, Heidelburg.

SPRING WHEAT, GROUP EXHIBITS.—*One entry.*

1st—Robert McKay, Maxville.

OATS, HAND SELECTED SEED OF FIRST OR SECOND YEARS.—*Four entries.*

1st—W. M. Smith, Scotland; 2nd—W. M. Smith, Scotland.

OATS, GROUP EXHIBITS.—*Five entries.*

1st—David Prouse, Goderich; 2nd—Duncan Carmichael, Jr., West Lorne.

SIX-ROWED BARLEY, GROUP EXHIBITS.—*Two entries.*

1st—Duncan Carmichael, West Lorne; 2nd—Duncan Carmichael, West Lorne.

CORN, 10 EARS, FLINT, WHITE, ANY VARIETY.—*Three entries.*

1st—W. J. Campbell, Snelgrove.

CORN, 10 EARS, FLINT, YELLOW, ANY VARIETY.—*Five entries.*

1st—Leonard D. Hankinson, Grovesend.
2nd—Harrison Smith, Ruthven.
3rd—W. J. Campbell, Snelgrove.

CORN, DENT, 10 EARS, WHITE, ANY VARIETY.—*Two entries.*

1st—Joseph C. Thomas, Blytheswood; 2nd—Harrison Smith, Ruthven.

CORN, DENT, YELLOW, 10 EARS, ANY VARIETY.—*Three entries.*

1st—G. W. Coatsworth & Son, Kingsville. 3rd—Chas. Ure, Windsor.
2nd—A. H. Woodbridge, Kingsville.

CORN, SWEET, ANY VARIETY.—*Four entries.*

1st—John McKee, Norwich.
2nd—Chas. Pearce, Wellington.
3rd—J. O. Duke, Olinda.
4th—A. H. Woodbridge, Kingsville.

POTATOES, ROUND WHITE TYPE.—*One entry.*

1st—W. M. Smith, Scotland.

POTATOES, LONG WHITE TYPE.—*One entry.*

1st—W. M. Smith, Scotland.

POTATOES, ROSE TYPE.—*One entry.*

1st—W. M. Smith, Scotland.

POULTRY.

LIGHT BRAHMAS.

Cocks, 10—1st, Wm. C. Wilson & Son; 2nd, Bartlett & Brown; 3rd, W. B. Nantel.

Hens, 9—1st, L. C. Sage; 2nd, Bartlett & Brown; 3rd, W. B. Nantel.

Cockerels, 15—1st, Bartlett & Brown; 2nd, W. B. Nantel; 3rd, Bartlett & Brown; 4th, H. R. K. Tozer.

Pullets, 16—1st and 2nd, Bartlett & Brown; 3rd and 4th, H. R. K. Tozer.

DARK BRAHMAS.

Cocks, 6—1st and 3rd, L. C. Sage; 2nd, W. B. Nantel.

Hens, 5—1st and 3rd, L. C. Sage; 2nd, C. A. R. Tilt.

Cockerels, 6—1st and 3rd, W. B. Nantel; 2nd, L. C. Sage.

Pullets, 9—1st and 3rd, L. C. Sage; 2nd, C. A. R. Tilt.

BUFF COCHINS.

Cocks, 9—1st, Hugh Wyatt; 2nd and 3rd, Holmhurst Poultry Yards.

Hens, 10—1st Holmhurst Poultry Yards; 2nd and 3rd, Hugh Wyatt.

Cockerels, 10—1st and 2nd, Hugh Wyatt; 3rd, Holmhurst Poultry Yards.

Pullets, 10—1st, 2nd and 3rd, Hugh Wyatt.

PARTRIDGE COCHINS.

Cocks, 6—1st, W. G. Murray; 2nd, W. B. Nantel; 3rd, G. J. Lawrie.

Hens, 7—1st, Richard Oke; 2nd, W. G. Murray; 3rd, W. B. Nantel.

Cockerels, 6—1st, 2nd and 3rd, W. B. Nantel.

Pullets, 6—1st and 3rd, W. B. Nantel; 2nd, Richard Oke.

BLACK COCHINS.

Cocks, 4—1st and 2nd, W. G. Murray; 3rd, A. J. George.

Hens, 4—1st and 3rd, W. G. Murray; 2nd, W. B. Nantel.

Cockerels, 4—1st, W. G. Murray; 2nd, A. J. George; 3rd, H. R. K. Tozer.

Pullets, 5—1st and 2nd, W. G. Murray; 3rd, H. R. K. Tozer.

WHITE COCHINS.

Cocks, 3—1st and 2nd, W. G. Murray; 3rd, W. B. Nantel.

Hens, 6—1st and 2nd, W. G. Murray; 3rd, W. B. Nantel.

Cockerels, 3—1st, Allen Bogue; 2nd and 3rd, W. G. Murray.

Pullets, 4—1st, Allen Bogue; 2nd and 3rd, W. G. Murray.

BLACK LANGSHANS.

Cocks, 7—1st, R. McCurdy; 2nd and 3rd, C. A. R. Tilt.
Hens, 6—1st, R. McCurdy; 2nd and 3rd, John Burgess.
Cockerels, 11—1st, C. A. R. Tilt; 2nd and 3rd, R. McCurdy.
Pullets, 9—1st and 3rd, R. McCurdy; 2nd, C. A. R. Tilt.

A. O. C. Langshans.

Cocks, 4—1st, Wm. J. Teale; 2nd and 3rd, Jas. Philpot & Son.
Hens, 4—1st, Wm. J. Teale; 2nd and 3rd, Jas. Philpot & Son.
Cockerels, 4—1st, Wm. J. Teale; 2nd and 3rd, Jas. Philpot & Son.
Pullets, 4—1st and 2nd, Jas. Philpot & Son; 3rd, Wm. J. Teale.

BARRED PLYMOUTH ROCKS.

Cocks, 25—1st, 3rd and 4th, N. Cosh; 2nd, I. K. Millard; 5th, J. Pringle.

Hens, 31—1st and 4th, John Pringle; 2nd, N. Cosh; 3rd, J. R. Boyce; 5th, 6th and 7th, I. K. Millard; 8th and 9th, Jas. R. Balfour; 10th, Elias Snyder.

Cockerels, 53—1st, 2nd and 5th, I. K. Millard; 3rd, 4th and 6th, N. Cosh; 7th, Thos. Lawless; 8th, F. W. Krouse; 9th, Frank Westbury; 10th, J. R. Boyce.

Pullets, 45—1st, John Pringle; 2nd and 8th, N. Cosh; 3rd, Elias Snyder; 4th, 5th and 6th, Frank Westbury; 7th, Jas. R. Balfour; 9th, G. Morton; 10th, John Pringle.

WHITE PLYMOUTH ROCKS.

Cocks, 23—1st, J. A. Carroll; 2nd, Geo. E. Monroe; 3rd, Daly & Dill; 4th, F. W. S. McNiven; 5th, Wm. E. Hoggarth.

Hens, 32—1st and 4th, Geo. A. Robertson; 2nd and 7th, Wm. E. Hoggarth; 3rd, Daly & Dill; 5th and 6th, Geo. E. Monroe; 8th, F. A. Andrews; 9th and 10th, H. H. Wallace.

Cockerels, 33—1st and 9th, H. H. Wallace; 2nd, Geo. E. Monroe; 3rd and 4th, F. A. Andrews; 5th, Jno. M. Shaw; 6th and 8th, Geo. A. Robertson; 7th and 10th, Daly & Dill.

Pullets, 33—1st and 2nd, F. A. Andrews; 3rd, Geo. A. Robertson; 4th, F. W. S. McNiven; 5th and 6th, Geo. E. Monroe; 7th, H. H. Wallace; 8th, Wm. E. Hoggarth; 9th, J. A. Carroll; 10th, Geo. Robertson.

BUFF PLYMOUTH ROCKS.

Cocks, 8—1st and 2nd, J. A. Harron; 3rd, J. R. Boyce.
Hens, 10—1st, J. A. Harron; 2nd, J. R. Boyce; 3rd, F. W. Krouse.
Cockerels, 16—1st, J. R. Boyce; 2nd and 4th, Dr. D. Marr; 3rd, F. W. Krouse.
Pullets, 15—1st and 2nd, Dr. D. Marr; 3rd, J. R. Boyce; 4th, Peter Gould.

GOLDEN-LACED WYANDOTTES.

Cocks, 14—1st, Wm. Daniel; 2nd, J. H. Magill; 3rd, A. W. Graham; 4th, John MacPherson.

Hens, 18—1st, Wilber Lemon; 2nd, Wray Bros.; 3rd, J. H. Magill; 4th, Wm. Daniel.

Cockerels, 18—1st and 2nd, John MacPherson; 3rd, Wm. Daniel; 4th, J. H. Magill.

Pullets, 20—1st, Wm. Daniel; 2nd, J. H. Magill; 3rd and 4th, A. W. Graham; 5th, P. Daley & Son.

SILVER-LACED WYANDOTTES.

Cocks, 11—1st and 2nd, Garland & Gilchrist; 3rd, F. W. Krouse.

Hens, 9—1st and 2nd, Garland & Gilchrist; 3rd, Wm. Daniel.

Cockerels, 14—1st, Jas. Arthur; 2nd and 3rd, Alfred Flawn; 4th, Wilber Lemon.

Pullets, 21—1st and 3rd, Alf. Flawn; 2nd and 5th, Garland & Gilchrist; 4th, Wilber Lemon.

BLACK WYANDOTTES.

Cocks, 7—1st, R. Dinner; 2nd, Howard Fraleigh; 3rd, Frank P. McDonnell.
Hens, 10—1st, H. Fraleigh; 2nd, W. Howard; 3rd, G. & J. Bogue.
Cockerels, 8—1st, H. Fraleigh; 2nd, F. P. McDonnell; 3rd, J. R. Smith.
Pullets, 12—1st and 4th, R. Dinner; 2nd, H. Fraleigh; 3rd, W. Howard.

BUFF WYANDOTTES.

Cocks, 10—1st, W. Moebus & Son; 2nd, Spry & Mick; 3rd, Bartlett & Brown.

Hens, 14—1st, W. Moebus & Son; 2nd and 4th, Packham & Allison; 3rd, Spry & Mick.

Cockerels, 18—1st, A. W. Graham; 2nd, Bartlett & Brown; 3rd, Jacob C. Sanderson; 4th, John McMullen.

Pullets, 20—1st, W. Moebus & Son; 2nd and 3rd, A. W. Graham; 4th and 5th, I. Hughes Samuel.

WHITE WYANDOTTES.

Cocks, 36—1st, 6th and 7th, John S. Martin; 2nd, 3rd and 10th, Chas. Massie; 4th and 9th, W. Dawson; 5th, Daly & Dill; 8th, Wm. Wilson.

Hens, 47—1st, Chas. Massie; 2nd, L. H. Baldwin; 3rd, Bedford & Coulter; 4th, 5th, 6th, 7th, 9th and 10th, John S. Martin; 8th G. Wilson Grieve.

Cockerels, 62—1st, Harry A. Ross; 2nd, 5th and 6th, W. Dawson; 3rd and 4th, John S. Martin; 7th, Wm. Wilson; 8th, R. L. Wheadon; 9th, Daly & Dill; 10th, A. Devitt.

Pullets, 70—1st and 7th, W. Dawson, 2nd, Bedford & Coulter; 3rd and 4th, John S. Martin; 5th, Harry A. Ross; 6th, Gideon Peer; 8th, Bedford & Coulter; 9th, Geo. Brierly; 10th, A. Devitt.

PARTRIDGE WYANDOTTES.

Cocks, 8—1st, L. C. Sage; 2nd, Wray Bros.; 3rd, Louis Smith.

Hens, 10—1st, L. C. Sage; 2nd, Wray Bros.; 3rd, W. Lemon.

Cockerels, 12—1st, 2nd and 4th, T. H. Scott; 3rd, A. Garthorne.

Pullets, 18—1st, Alf. Flawn; 2nd, Wm. Monahan; 3rd and 4th, T. H. Scott.

COLUMBIAN WYANDOTTES.

Cocks, 4—1st and 3rd, T. H. Scott; 2nd, W. C. Pranschke.

Hens, 3—1st and 2nd, T. H. Scott.

Cockerels, 8—1st and 3rd, T. H. Scott; 2nd, L. C. Sage.

Pullets, 9—1st, T. H. Scott; 2nd, Doidge & McNeil; 3rd, L. C. Sage.

DOMINIQUES.

Cocks, 3—1st, G. B. Carbert; 2nd, A. H. G. Luxton; 3rd, M. T. Burn & Son.

Hens, 3—1st, M. T. Burn & Son; 2nd, G. B. Carbert; 3rd, A. G. H. Luxton.

Cockerels, 6—1st, G. & J. Bogue; 2nd, M. T. Burn & Son; 3rd, G. B. Carbert.

Pullets, 5—1st, G. B. Carbert; 2nd and 3rd, M. T. Burn & Son.

BLACK JAVAS.

Cocks, 1—1st, Richard Oke.

Hens, 2—1st, Richard Oke; 2nd, F. W. Krouse.

Cockerels, 2—1st, F. W. Krouse; 2nd, G. & J. Bogue.

Pullets, 2—1st, F. W. Krouse; 2nd, G. & J. Bogue.

MOTTLED JAVAS.

Cocks, 1—1st, Richard Oke.

Hens, 2—1st, G. & J. Bogue; 2nd, Richard Oke.

Cockerels, 2—1st, G. & J. Bogue; 2nd, Richard Oke.

Pullets, 3—1st, G. & J. Bogue; 2nd, Richard Oke; 3rd, W. H. Read.

RHODE ISLAND REDS.

Cocks, 9—1st, W. A. McMaster; 2nd, S. H. Smiley; 3rd, J. R. Boyce.

Hens, 9—1st, W. A. McMaster; 2nd, Emil Wankel; 3rd, Ottawa Poultry Yards.

Cockerels, 23—1st, Ottawa Poultry Yards; 2nd, S. H. Smiley; 3rd, J. A. Hughes; 4th, T. E. Klager.

Pullets, 22—1st, 2nd and 3rd, S. H. Smiley; 4th, J. R. Boyce; 5th, J. A. Hughes.

BLACK RED GAMES.

Cocks, 7—1st and 2nd, Walter H. Butler; 3rd, John W. Benson.

Hens, 10—1st and 3rd, W. H. Butler; 2nd, J. W. Benson.

Cockerels, 9—1st and 3rd, W. H. Butler; 2nd, Morley & Earle.

Pullets—1st and 2nd, W. H. Butler; 3rd, Morley & Earle.

BROWN RED GAMES.

Cocks, 6—1st, A. H. Trebilcock; 2nd, Wm. J. Teale; 3rd, W. Barber.
Hens, 9—1st, W. Barber; 2nd, Wm. J. Teale; 3rd, A. H. Trebilcock.
Cockerels, 6—1st, Telfer Bros.; 2nd and 3rd, A. H. Trebilcock.
Pullets, 4—1st and 3rd, W. Barber; 2nd, A. H. Trebilcock.

DUCKWING GAME.

Cocks, 5—1st and 2nd, W. Barber; 3rd, Jas. Philpot & Son.
Hens, 4—1st and 2nd, W. Barber; 3rd, Jas. Philpot & Son.
Cockerels, 3—1st, Telfer Bros.; 2nd, Jas. Philpot & Son; 3rd, W. Barber.
Pullets, 4—1st and 2nd, W. Barber; 3rd, Jas. Philpot & Son.

PYLE GAME.

Cocks, 4—1st, John Parkinson; 2nd, A. H. Trebilcock; 3rd, Tom Sherlock.
Hens, 4—1st and 3rd, John Parkinson; 2nd, Tom Sherlock.
Cockerels, 6—1st and 3rd, John Parkinson; 2nd, Tom Sherlock.
Pullets, 6—1st and 3rd, John Parkinson; 2nd, Tom Sherlock.

INDIAN GAME, ANY VARIETY.

Cocks, 6—1st and 3rd, Topping & Finchamp; 2nd, Chas. LaRose.
Hens, 10—1st and 3rd, Chas. LaRose; 2nd, Liddon Bros.
Cockerels, 11—1st, Topping & Finchamp; 2nd, Smith & Brown; 3rd, Liddon Bros.
Pullets, 9—1st and 3rd, Topping & Finchamp; 2nd, Chas. LaRose.

BLACK SUMATRA GAME.

Cocks, 4—1st, 2nd and 3rd, Fred. D. King.
Hens, 4—1st, C. J. Daniels; 2nd and 3rd, Fred. D. King.
Cockerels, 5—1st, C. J. Daniels; 2nd, A. H. Graves; 3rd, Fred. D. King.
Pullets, 7—1st, C. J. Daniels; 2nd and 3rd, Fred. D. King.

BIRCHEN GAME.

Cocks, 1—W. Barber.
Hens, 3—1st, W. Barber; 2nd and 3rd, Wm. J. Teale.
Cockerels, 3—1st, A. H. Trebilcock; 2nd, W. Barber; 3rd, Wm. J. Teale.
Pullets, 2—1st, W. Barber; 2nd, A. H. Trebilcock.

A. O. S. V. GAME.

Cocks, 2—1st, M. T. Burn & Son; 2nd, Liddon Bros.
Hens, 3—1st and 3rd, M. T. Burn & Son; 2nd, Liddon Bros.
Cockerels, 4—1st and 2nd, W. A. McMaster; 3rd, Thos. Finn.
Pullets, 3—1st, Thos. Finn; 2nd, W. A. McMaster.

WHITE R. C. LEGHORNS.

Cocks, 7—1st, M. R. Hoover; 2nd, Herbert C. Jay; 3rd, W. J Bell.
Hens, 6—1st, W. J. Bell; 2nd, M. R. Hoover; 3rd, Herbert C. Jay.
Cockerels, 8—1st, M. R. Hoover; 2nd, Richard Oke; 3rd, W. J. Bell.
Pullets, 7—1st and 2nd, W. J. Bell; 3rd, M. R. Hoover.

S. C. WHITE LEGHORNS.

Cocks, 16—1st, 2nd and 4th, Dr. R. C. Coates; 3rd, Wm. Ferguson.

Hens, 16—1st, F. Wales; 2nd and 4th, Jas. L. McCormack; 3rd, A. & T. Readwin.

Cockerels, 33—1st, 2nd and 3rd, Wm. Ferguson; 4th and 5th, Dr. R. C. Coates; 6th and 9th, Donald McKellar; 7th, Thos. Wardell; 8th, F. Wales; 10th, E. Syer.

Pullets, 38—1st and 6th, D. McKellar; 2nd and 4th, Wm. Ferguson; 3rd, F. Wales; 5th, J. L. McCormack; 7th and 8th, Thos. Wardell; 9th, Wm. E. Hoggarth; 10th, John C. Durst.

BLACK LEGHORNS.

Cocks, 6—1st and 2nd, A. C. Doan; 3rd, W. M. Osborne.
Hens, 9—1st, J. H. Edsall; 2nd, A. C. Doan; 3rd, Russell H. Chant.
Cockerels, 13—1st and 3rd, Russell H. Chant; 2nd, W. M. Osborne; 4th, J. H. Edsall.
Pullets, 16—1st, 3rd and 4th, W. M. Osborne; 2nd, G. G. Henderson.

R. C. BROWN LEGHORNS.

Cocks, 9—1st, Wm. C. Wilson & Son; 2nd, T. J. Conley; 3rd, Wm. Cadman.
Hens, 17—1st and 2nd, Wm. Cadman; 3rd, T. J. Conley; 4th, H. R. K. Tozer.
Cockerels, 16—1st, H. R. K. Tozer; 2nd and 4th, Wm. Cadman; 3rd, Wm. C. Wilson & Son.
Pullets, 19—1st and 2nd, Wm. C. Wilson & Son; 3rd, Wm. Cadman; 4th, H. R. K. Tozer.

S. C. BROWN LEGHORNS.

Cocks, 12—1st, John Bradley; 2nd, 3rd and 4th, H. F. Becker.
Hens, 17—1st, G. G. Henderson; 2nd, E. E. Orr; 3rd, W. A. Gurney; 4th, J. Streib.
Cockerels, 25—1st and 5th, F. H. Becker; 2nd, J. Streib; 3rd, J. Bradley; 4th, G. G. Henderson.
Pullets, 26—1st, W. A. Gurney; 2nd and 3rd, H. F. Becker; 4th, E. E. Orr; 5th, G. G. Henderson.

BUFF LEGHORNS.

Cocks, 9—1st and 2nd, E. Jefferies; 3rd, Frank Stagg.
Hens, 7—1st, James Dundas; 2nd, N. K. Cornwall; 3rd, E. Jefferies.
Cockerels, 9—1st and 2nd, N. K. Cornwall; 3rd, James Dundas.
Pullets, 9—1st, Frank Stagg; 2nd, N. K. Cornwall; 3rd, E. Jefferies.

SPANISH.

Cocks, 2—1st, G. & J. Bogue; 2nd, G. J. Lawrie.
Cockerels, 3—1st, G. & J. Bogue; 2nd, J. H. Edsall; 3rd, H. S. Ruby & Son
Pullets, 3—1st, G. & J. Bogue; 2nd, J. H. Edsall; 3rd, H. S. Ruby & Son.

S. C. BLACK MINORCAS.

Cocks, 10—1st, H. Dunne; 2nd, W. H. Fairley; 3rd, T. A. Faulds.
Hens, 8—1st and 3rd, J. H. Minshall; 2nd, H. Dunne.
Cockerels, 24—1st, Chas. Gorvett; 2nd and 4th, J. H. Minshall; 3rd and 5th, Henry Dunne.
Pullets, 22—1st, H. Dunne; 2nd, Chas. Gorvett; 3rd, W. H. Fairley; 4th and 5th. J. H. Minshall.

R. C. BLACK MINORCAS.

Cocks, 7—1st, A. E. Bell; 2nd, J. H. Minshall; 3rd, C. W. P. Brock.
Hens, 10—1st and 2nd, A. E. Bell; 3rd, C. W. P. Brock.
Cockerels, 15—1st and 3rd, J. H. Minshall; 2nd, C. W. P. Brock; 4th, Frank P. McDonnell.
Pullets, 11—1st and 2nd, T. A. Fauld; 3rd, John E. Holden.

WHITE MINORCAS.

Cocks, 3—1st, Harry C. Meiselbach; 2nd, W. M. Osborne.
Hens, 6—1st, 2nd and 3rd, Harry C. Meiselbach.
Cockerels, 7—1st and 3rd, Wm. Brown; 2nd, A. C. Moyer.
Pullets, 7—1st and 2nd, Wm. Brown; 3rd, A. C. Moyer.

ANDALUSIANS.

Cocks, 5—1st, G. Howard; 2nd, I. T. Knight; 3rd, F. Wales.
Hens, 9—1st, R. Book; 2nd, G. Howard; 3rd, Chas. LaRose.
Cockerels, 11—1st, 2nd and 3rd, H. V. Cosh.
Pullets, 5—1st, H. V. Cosh; 2nd, Chas. LaRose; 3rd, Chas. Richardson.

SILVER GREY DORKINGS.

Cocks, 9—1st, Harry McKee; 2nd, Wallace McGlennon; 3rd, R. Goldie.
Hens, 8—1st, E. B. Palmer; 2nd, Douglas Thomson; 3rd, Harry McKee.
Cockerels, 11—1st, W. McGlennon; 2nd, A. McDougall & Son; 3rd, H. McKee
Pullets, 11—1st, H. McKee; 2nd, W. McGlennon; 3rd, A. Bogue.

COLORED DORKINGS.

Cocks, 2—1st, J. H. Warrington; 2nd, J. M. McCormick.
Hens, 2—1st, J. M. McCormack; 2nd, J. H. Warrington.
Cockerels, 3—1st and 3rd, J. M. McCormack; 2nd, J. H. Warrington.
Pullets, 3—1st and 3rd, J. M. McCormack; 2nd, J. H. Warrington.

WHITE DORKINGS.

Cocks, 3—1st, J. H. Warrington; 2nd and 3rd, Allen Bogue.
Hens, 4—1st and 3rd, Allen Bogue; 2nd, J. H. Warrington.
Cockerels, 2—1st, Allen Bogue.
Pullets, 1—1st, J. H. Warrington.

BUFF ORPINGTONS.

Cocks, 20—1st and 5th, C. M. Blyth; 2nd, A. W. E. Hellyer; 3rd, W. Dawson; 4th, H. A. Hoffman.

Hens, 28—1st and 2nd, J. W. Clark; 3rd, C. M. Blyth; 4th and 5th, A. W. E. Hellyer.

Cockerels, 44—1st, J. W. Clark; 2nd, P. E. Aird; 3rd, A. W. E. Hellyer; 4th, H. A. Hoffman; 5th, R. Barnes; 6th and 9th, Alf. Boultbee; 7th, J. S. Niven; 8th, C. M. Blyth; 10th, Wm. Daniel.

Pullets, 44—1st, 2nd and 3rd, R. Barnes; 4th, Dr. D. Marr; 5th and 10th, A. W. E. Hellyer; 6th, J. C. Sanderson; 7th and 8th, P. E. Aird; 9th, G. B. Carbert.

BLACK ORPINGTONS.

Cocks, 13—1st, H. A. Hoffman; 2nd and 3rd, H. J. Hurd; 4th, Kemp and Waterman.

Hens, 22—1st, H. A. Hoffman; 2nd and 5th, W. Dawson; 3rd, E. A. Rawlings; 4th, M. H. Stroh.

Cockerels, 25—1st, M. H. Stroh; 2nd, C. J. Daniels; 3rd and 5th, Kemp and Waterman; 4th, Jas. R. Hamilton.

Pullets, 31—1st and 6th, C. J. Daniels; 2nd, R. Heard; 3rd, P. E. Aird; 4th, 8th and 9th, H. A. Hoffman; 5th and 7th, W. Dawson; 10th, H. J. Hurd.

A. O. C. ORPINGTONS.

Cocks, 3—1st, W. A. Roberts; 2nd and 3rd, W. Dawson.
Hens, 5—1st and 2nd, W. Dawson; 3rd, W. H. Reid.
Cockerels, 6—1st and 2nd, W. A. Roberts; 3rd, W. Dawson.
Pullets, 9—1st and 2nd, W. A. Roberts; 3rd, W. Dawson.

HOUDANS.

Cocks, 6—1st, Geo. Degroff; 2nd, G. J. Lawrie; 3rd, Wm. C. Wilson & Son.
Hens, 6—1st, Percy Charlton; 2nd, H. S. Ruby & Son; 3rd, Geo. Degroff.
Cockerels, 6—1st, G. & J. Bogue; 2nd, Smith & Brown; 3rd, Geo. Degroff.
Pullets, 10—1st, G. & J. Bogue; 2nd, P. Charlton; 3rd, A. Bogue.

CREVE COEURS.

Cocks, 2—1st, G. & J. Bogue; 2nd, Richard Oke.
Hens, 2—1st, Richard Oke; 2nd, G. & J. Bogue.
Cockerels, 2—1st, G. & J. Bogue; 2nd, Richard Oke.
Pullets, 2—1st, G. & J. Bogue; 2nd, Richard Oke.

LA FLECHE.

Cocks, 2—1st, G. & J. Bogue; 2nd, Richard Oke.
Hens, 2—1st, G. & J. Bogue; 2nd, Richard Oke.
Cockerels, 2—1st, Richard Oke; 2nd, G. & J. Bogue.
Pullets, 2—1st, G. & J. Bogue; 2nd, Richard Oke.

W. C. B. POLANDS.

Cocks, 2—1st, Wm. McNeil; 2nd, Allen Bogue.
Hens, 2—1st, Wm. McNeil; 2nd, Allen Bogue.
Cockerels, 5—1st and 3rd, W. B. Nantel; 2nd, G. & J. Bogue.
Pullets, 4—1st, Wm. McNeil; 2nd, Allen Bogue; 3rd, W. B. Nantel.

GOLDEN POLANDS.

Cocks, 2—1st, Wm. McNeil; 2nd, Allen Bogue.
Hens, 2—1st, Allen Bogue; 2nd, Wm. McNeil.
Cockerels, 2—1st, Wm. McNeil; 2nd, Allen Bogue.
Pullets, 2—1st, Wm. McNeil; 2nd, Allen Bogue.

SILVER POLANDS.

Cocks, 2—1st, Allen Bogue; 2nd, M. T. Burn & Son.
Hens, 2—1st, M. T. Burn & Son; 2nd, Allen Bogue.
Cockerels, 3—1st and 2nd, Allen Bogue; 3rd, M. T. Burn & Son
Pullets, 2—1st, Allen Bogue; 2nd, M. T. Burn & Son.

WHITE POLANDS.

Cocks, 2—1st, Wm. McNeil; 2nd Allen Bogue.
Hens, 3—1st, Allen Bogue; 2nd, Wm. McNeil; 3rd, John W. Benson.
Cockerels, 2—1st, Wm. McNeil; 2nd, Allen Bogue.
Pullets, 2—1st, Wm. McNeil; 2nd, Allen Bogue.

GOLDEN BEARDED POLANDS.

Cocks, 3—1st, Wm. McNeil; 2nd, Allen Bogue; 3rd, G. & J. Bogue.
Hens, 3—1st, Wm. McNeil; 2nd, G. & J. Bogue; 3rd, Allen Bogue.
Cockerels, 3—1st, G. & J. Bogue; 2nd, Wm. McNeil; 3rd, Allen Bogue.
Pullets, 3—1st, G. & J. Bogue; 2nd, Wm. McNeil; 3rd, Allen Bogue.

SILVER BEARDED POLANDS.

Cocks, 5—1st, G. & J. Bogue; 2nd, W. B. Nantel; 3rd, Allen Bogue.
Hens, 5—1st, A. Bogue; 2nd, J. H. Warrington; 3rd, G. & J. Bogue.
Cockerels, 4—1st, G. & J. Bogue; 2nd and 3rd, W. B. Nantel.
Pullets, 4—1st, W. B. Nantel; 2nd, A. Bogue; 3rd, G. & J. Bogue.

WHITE BEARDED POLANDS.

Cocks, 2—1st, Allen Bogue; 2nd, Wm. McNeil.
Hens, 3—1st, Wm. McNeil; 2nd, A. Bogue; 3rd, Peter Gould.
Cockerels, 2—1st, Wm. McNeil; 2nd, Peter Gould.
Pullets, 2—1st, Allen Bogue; 2nd, Wm. McNeil.

BUFF LACED POLANDS.

Cocks, 2—1st, G. & J. Bogue; 2nd, Wm. McNeil.
Hens, 2—1st, G. & J. Bogue; 2nd, Wm. McNeil.
Cockerels, 3—1st and 3rd, G. & J. Bogue; 2nd, Wm. McNeil.
Pullets, 3—1st and 2nd, G. & J. Bogue; 3rd, Wm. McNeil.

GOLDEN SPANGLED HAMBURGS.

Cocks, 2—1st, James Baptie; 2nd, Richard Oke.
Hens, 4—1st and 3rd, Richard Oke; 2nd, James Baptie.
Cockerels, 2—1st and 2nd, Richard Oke.
Pullets, 4—1st, James Baptie; 2nd and 3rd, Richard Oke.

SILVER SPANGLED HAMBURGS.

Cocks, 3—1st, Wm. Cadman; 2nd, Richard Oke.
Hens, 4—1st, James Baptie; 2nd, Wm. Cadman; 3rd, Richard Oke.
Cockerels, 4—1st and 2nd, Richard Oke; 3rd, Wm. Cadman.
Pullets, 8—1st, James Baptie; 2nd, F. W. Krouse; 3rd, Wm. Cadman.

GOLDEN PENCILLED HAMBURGS.

Cocks, 2—1st, Richard Oke; 2nd, Herman Liszt.
Hens, 3—1st and 2nd, Richard Oke; 3rd, Herman Liszt.
Cockerels, 4—1st and 2nd, Richard Oke; 3rd, Thos. McMurray.
Pullets, 4—1st and 2nd, Richard Oke; 3rd, Thos. McMurray.

SILVER PENCILLED HAMBURGS.

Cocks, 3—1st, Wm. C. Wilson & Son; 2nd, Richard Oke.
Hens, 3—1st, Richard Oke; 2nd, W. H. Reid; 3rd, Wm. C. Wilson & Son.
Cockerels, 3—1st and 2nd, Richard Oke; 3rd, Wm. C. Wilson & Son.
Pullets, 3—1st and 2nd, Richard Oke; 3rd, Wm. C. Wilson & Son.

BLACK HAMBURGS.

Cocks, 2—1st and 2nd, Richard Oke.
Hens, 2—1st and 2nd, Richard Oke.
Cockerels, 6—1st and 2nd, Richard Oke; 3rd, F. W. Krouse.
Pullets, 7—1st and 3rd, Richard Oke; 2nd, F. W. Krouse.

RED CAPS.

Cocks, 3—1st and 3rd, E. Wells, Jr.; 2nd, C. J. Daniels.
Hens, 4—1st, J. H. Warrington; 2nd, E. Wells, Jr.; 3rd, C. J. Daniels.
Cockerels, 5—1st, W. E. Wright; 2nd, G. & J. Bogue; 3rd, C. J. Daniels.
Pullets, 6—1st, G. & J. Bogue; 2nd, W. E. Wright; 3rd, E. Wells, Jr.

SULTANS.

Cocks, 2—1st, Richard Oke; 2nd, G. & J. Bogue.
Hens, 2—1st, Richard Oke; 2nd, G. & J. Bogue.
Cockerels, 2—1st, G. & J. Bogue; 2nd, Richard Oke.
Pullets, 2—1st, Richard Oke; 2nd, G. & J. Bogue.

SILKIES.

Cocks, 2—1st, H. B. Donovan; 2nd, C. J. Daniels.
Hens, 2—1st, H. B. Donovan; 2nd, C. J. Daniels.
Cockerels, 2—1st, Teddie Saunders; 2nd, C. J. Daniels.
Pullets, 5—1st, H. B. Donovan; 2nd and 3rd, Teddie Saunders.

ANY OTHER VARIETY FOWLS.

Cocks, 5—1st and 3rd, Bartlett and Brown; 2nd, Wm. Thorpe.
Hens, 5—1st, M. J. Schlabach; 2nd, Wm. McNeil; 3rd, Wm. Thorpe.
Cockerels, 10—1st, M. J. Schlabach; 2nd, C. Schelter; 3rd, H. G. Jones.
Pullets, 11—1st and 2nd, C. Schelter; 3rd, Bartlett & Brown.

BLACK RED GAME BANTAMS.

Cocks, 7—1st, 2nd and 3rd, Chas. R. Crowe.
Hens, 6—1st, 2nd and 3rd, Chas. R. Crowe.
Cockerels, 9—1st, Rook Bros.; 2nd and 3rd, Chas. R. Crowe.
Pullets, 13—1st and 3rd, Chas. R. Crowe; 2nd and 4th, Rook Bros.

BROWN RED GAME BANTAMS.

Cocks, 5—1st and 3rd, W. Barber; 2nd, Tyson & McMaster.
Hens, 5—1st and 2nd, W. Barber; 3rd, Tyson & McMaster.
Cockerels, 4—1st, Tyson & McMaster; 2nd and 3rd, W. Barber.
Pullets, 11—1st, Rook Bros.; 2nd and 3rd, Tyson & McMaster.

DUCKWING GAME BANTAMS.

Cocks, 7—1st and 3rd, John Crowe; 2nd, Wm. H. Pearson.
Hens, 6—1st, John Crowe; 2nd, Rook Bros.; 3rd, W. Barber.
Cockerels, 6—1st, W. Barber; 2nd and 3rd, Chas. R. Crowe.
Pullets, 7—1st and 2nd, John Crowe; 3rd, W. Barber.

PYLE GAME BANTAMS.

Cocks, 11—1st and 3rd, Thos. Bower; 2nd and 4th, Tyson & McMaster.
Hens, 10—1st, 2nd and 3rd, Tyson & McMaster.
Cockerels, 22—1st, Thos. Bower; 2nd, Hart & Grimoldby; 3rd, 4th and 5th, Tyson & McMaster.
Pullets, 23—1st and 2nd, Hart & Grimoldby; 3rd, Thos. Bower; 4th, W. Barber; 5th, Tyson & McMaster.

WHITE GAME BANTAMS.

Cocks, 3—1st, 2nd and 3rd, H. B. Donovan.
Hens, 3—1st, 2nd and 3rd, H. B. Donovan.
Cockerels, 5—1st, 2nd and 3rd, H. B. Donovan.
Pullets, 3—1st, 2nd and 3rd, H. B. Donovan.

BIRCHEN GAME BANTAMS.

Cocks, 2—1st, S. D. Furminger; 2nd, H. B. Donovan.
Hens, 4—1st, H. B. Donovan; 2nd, Rook Bros.; 3rd, S. D. Furminger.
Cockerels, 8—1st, Rook Bros.; 2nd, H. B. Donovan; 3rd, S. D. Furminger.
Pullets, 4—1st, H. B. Donovan; 2nd, Rook Bros.; 3rd, S. D. Furminger.

A. O. V. GAME BANTAMS.

Cocks, 2—1st, H. B. Donovan; 2nd, M. T. Burn & Son.
Hens, 5—1st, Rook Bros.; 2nd, M. T. Burn & Son; 3rd, H. B. Donovan.
Cockerels, 2—1st, H. B. Donovan; 2nd, Doidge & McNeil.
Pullets, 4—1st, H. B. Donovan; 2nd and 3rd, Tyson & McMaster.

GOLDEN SEBRIGHT BANTAMS.

Cocks, 9—1st, Richard Oke; 2nd, T. J. Kiley; 3rd, W. Howard.
Hens, 9—1st, Richard Oke; 2nd, W. G. Murray; 3rd, T. J. Kiley.
Cockerels, 6—1st, T. J. Kiley; 2nd, W. G. Murray; 3rd, W. Howard.
Pullets, 6—1st, Richard Oke; 2nd, T. J. Kiley; 3rd, W. G. Murray.

SILVER SEBRIGHT BANTAMS.

Cocks, 5—1st and 2nd, Richard Oke; 3rd, W. G. Murray.
Hens, 7—1st and 2nd, Richard Oke; 3rd, Geo. Poole.
Cockerels, 4—1st and 2nd, Richard Oke; 3rd, W. G. Murray.
Pullets, 4—1st and 2nd, Richard Oke; 3rd, W. G. Murray.

BLACK ROSE COMB BANTAMS.

Cocks, 7—1st, Doidge & McNeil; 2nd, H. B. Donovan; 3rd, Richard Oke.
Hens, 9—1st, H. B. Donovan; 2nd, Richard Oke; 3rd, Doidge & McNeil.
Cockerels, 10—1st, W. G. Murray; 2nd, W. H. Fairley; 3rd, Richard Oke.
Pullets, 12—1st, W. G. Murray; 2nd, Richard Oke; 3rd, W. J. Sleesor; 4th, James H. Westbrook.

WHITE ROSE COMB BANTAMS.

Cocks, 4—1st, W. G. Murray; 2nd, Richard Oke; 3rd, H. B. Donovan.
Hens, 4—1st, W. G. Murray; 2nd, H. B. Donovan; 3rd, Richard Oke.
Cockerels, 3—1st, Richard Oke; 2nd, W. G. Murray; 3rd, H. B. Donovan.
Pullets, 3—1st, W. G. Murray; 2nd, H. B. Donovan; 3rd, Richard Oke.

White Cochin Bantams.

Cocks, 4—1st, Doidge & McNeil; 2nd, J. R. Boyce; 3rd, W. W. Simpson.
Hens, 10—1st, H. Rawnsley; 2nd, J. R. Boyce; 3rd, Stevenson Bros.
Cockerels, 8—1st and 2nd, J. R. Boyce; 3rd, Stevenson Bros.
Pullets, 9—1st, Doidge & McNeil; 2nd and 3rd, J. R. Boyce.

Buff Cochin Bantams.

Cocks, 4—1st, J. R. Boyce; 2nd, H. H. Rosser; 3rd, Doidge & McNeil.
Hens, 6—1st and 3rd, H. H. Rosser; 2nd, J. R. Boyce.
Cockerels, 6—1st, C. A. R. Tilt; 2nd, Stevenson Bros.; 3rd, Doidge & McNeil.
Pullets, 8—1st and 2nd, J. R. Boyce; 3rd, Stevenson Bros.

Black Cochin Bantams.

Cocks, 9—1st and 3rd, Doidge & McNeil; 2nd, F. M. Briggs; 4th, W. B. Nantel.
Hens, 16—1st and 2nd, H. Fraleigh; 3rd and 4th, Doidge & McNeil.
Cockerels, 14—1st and 3rd, Doidge & McNeil; 2nd, W. E. Raymo; 4th, F. M. Briggs.
Pullets, 14—1st and 3rd, F. M. Briggs; 2nd, H. Fraleigh; 4th, Doidge & McNeil.

Partridge Cochin Bantams.

Cocks, 9—1st, R. & I. Graham; 2nd, H. B. Donovan; 3rd, H. R. K. Tozer.
Hens, 13—1st and 2nd, Wm. C. Wilson & Son; 3rd, Wm. Cadman; 4th, H. R. K. Tozer.
Cockerels, 7—1st and 2nd, Wm. C. Wilson & Son; 3rd, H. B. Donovan.
Pullets, 6—1st, H. R. K. Tozer; 2nd, H. B. Donovan; 3rd, Wm. C. Wilson & Son.

White Booted Bantams.

Cocks, 4—1st, T. J. Kiley; 2nd, Richard Oke; 3rd, Wm. J. Teale.
Hens, 4—1st, T. J. Kiley; 2nd, Richard Oke; 3rd, Wm. J. Teale.
Cockerels, 3—1st, T. J. Kiley; 2nd, Wm. J. Teale; 3rd, Richard Oke.
Pullets, 2—1st, Wm. J. Teale; 2nd, Richard Oke.

Black-Tailed Japanese Bantams.

Cocks, 3—1st, H. B. Donovan; 2nd, Richard Oke; 3rd, W. G. Murray.
Hens, 3—1st, Richard Oke; 2nd, W. G. Murray; 3rd, H. B. Donovan.
Cockerels, 3—1st, W. G. Murray; 2nd, H. B. Donovan; 3rd, Richard Oke.
Pullets, 4—1st, Richard Oke; 2nd, W. G. Murray; 3rd, H. B. Donovan.

White Japanese Bantams.

Cocks, 3—1st, Richard Oke; 2nd, W. G. Murray; 3rd, H. B. Donovan.
Hens, 3—1st, W. G. Murray; 2nd, Richard Oke; 3rd, H. B. Donovan.
Cockerels, 4—1st, Richard Oke; 2nd, James Farley; 3rd, W. G. Murray
Pullets, 4—1st, Richard Oke; 2nd, W. G. Murray; 3rd, H. B. Donovan.

Black Japanese Bantams.

Cocks, 3—1st, Richard Oke; 2nd, W. G. Murray; 3rd, H. B. Donovan.
Hens, 3—1st, Richard Oke; 2nd, W. G. Murray; 3rd, H. B. Donovan.
Cockerels, 3—1st, W. G. Murray; 2nd, Richard Oke; 3rd, H. B. Donovan.
Pullets, 4—1st, H. B. Donovan; 2nd, W. G. Murray; 3rd, Richard Oke.

Polish Bearded Bantams.

Cocks, 4—1st, W. G. Murray; 2nd, T. J. Kiley; 3rd, Richard Oke.
Hens, 4—1st, W. G. Murray; 2nd, T. J. Kiley; 3rd, H. B. Donovan.
Cockerels, 5—1st, W. G. Murray; 2nd, Richard Oke; 3rd, T. J. Kiley.
Pullets, 3—1st, W. G. Murray; 2nd, H. B. Donovan.

POLISH UNBEARDED BANTAMS.

Cocks, 3—1st, Richard Oke; 2nd, W. G. Murray; 3rd, H. B. Donovan.
Hens, 3—1st, W. G. Murray; 2nd, Richard Oke; 3rd, H. B. Donovan.
Cockerels, 4—1st, Richard Oke; 2nd, W. G. Murray; 3rd, H. B. Donovan.
Pullets, 5—1st and 2nd, H. B. Donovan; 3rd, W. G. Murray.

A. O. V. BANTAMS.

Cocks, 5—1st and 2nd, T. J. Kiley; 3rd, Robert S. Dickie.
Hens, 7—1st, H. B. Donovan; 2nd, T. J. Kiley; 3rd, W. E. Raymo.
Cockerels, 9—1st, L. A. Brill; 2nd, T. J. Kiley; 3rd, R. S. Dickie.
Pullets, 10—1st, R. S. Dickie; 2nd, H. B. Donovan; 3rd, T. J. Kiley.

BRONZE TURKEYS. (*2 years and up*).

Cocks, 5—1st, W. J. Bell; 2nd, W. E. Wright; 3rd and 4th, A. McDougall & Son.
Hens, 8—1st, 3rd and 5th, W. J. Bell; 2nd, A. McDougall & Son; 4th, Chas. Gould.

BRONZE TURKEYS. (*Under 2 years*).

Cocks, 6—1st, A. McDougall & Son; 2nd, W. J. Bell; 3rd, W. H. Beattie; 4th, Chas. Gould; 5th, William Collins.

Hens, 8—1st, 2nd and 4th, W. J. Bell; 3rd, A. McDougall & Son; 5th, Chas. Gould.

Cockerels, 15—1st, W. J. Bell; 2nd, Chas. Gould; 3rd and 4th, A. McDougall & Son; 5th, W. E. Wright.

Pullets, 16—1st and 4th, A. McDougall & Son; 2nd and 5th, W. J. Bell; 3rd, W. E. Wright.

WHITE TURKEYS.

Cocks, 7—1st and 5th, W. H. Beattie; 2nd and 3rd, Baker Bros.; 4th, Hastings Bros.

Hens, 6—1st and 4th, W. H. Beattie; 2nd, Baker Bros.; 3rd, Miss Mary Colwell.
Cockerels, 8—1st, A. G. H. Luxton; 2nd and 3rd, Baker Bros.; 4th, W. H. Beattie.
Pullets, 8—1st and 3rd, W. H. Beattie; 2nd and 4th, Baker Bros.

A. O. V. TURKEYS.

Cocks, 3—1st, Baker Bros.; 2nd and 3rd, A. G. H. Luxton.
Hens, 5—1st, Baker Bros.; 2nd and 3rd, A. G. H. Luxton; 4th, W. H. Beattie.
Cockerels, 5—1st and 3rd, A. G. H. Luxton; 2nd, Baker Bros.
Pullets, 5—1st, W. H. Beattie; 2nd, Baker Bros.; 3rd and 4th, A. G. H. Luxton.

TOULOUSE GEESE.

Ganders, 8—1st, Miss Mary Colwell; 2nd, M. T. Burn & Son; 3rd, Baker Bros.; 4th, Thos. N. Shea.

Geese, 7—1st, M. T. Burn & Son; 2nd, Thos. M. Shea; 3rd, Baker Bros.; 4th, Miss Mary Colwell.

Ganders, 1906, 8—1st and 3rd, Scanlon Bros.; 2nd, James M. McCormack; 4th, Baker Bros.

Geese, 1906, 8—1st, James M. McCormack; 2nd and 3rd, Scanlon Bros.; 4th, A. McDougall & Son.

EMBDEN GEESE.

Ganders, 10—1st, Miss Mary Colwell; 2nd, Baker Bros.; 3rd, A. McDougall & Son; 4th, C. M. Blyth.

Geese, 9—1st, Miss Mary Colwell; 2nd, C. A. R. Tilt; 3rd, Scanlon Bros.; 4th, A. McDougall & Son.

Ganders, 1906, 6—1st, Miss Mary Colwell; 2nd, C. M. Blyth; 3rd, Scanlon Bros.; 4th, Thos. M. Shea.

Geese, 1906, 6—1st, Miss Mary Colwell; 2nd, Scanlon Bros.; 3rd, Colin M. Blyth; 4th, A. McDougall & Son.

CHINESE GEESE.

Ganders, 7—1st and 3rd, G. J. Lawrie; 2nd, W. M. Smith.
Geese, 7—1st and 3rd, G. J. Lawrie; 2nd, W. M. Smith.
Ganders, 1906, 7—1st and 2nd, G. J. Lawrie; 3rd, A. G. H. Luxton.
Geese, 1906, 7—1st and 2nd, G. J. Lawrie; 3rd, T. M. Shea.

A. O. V. GEESE.

Ganders, 7—1st and 2nd, M. T. Burn & Son; 3rd, C. A. R. Tilt.
Geese, 5—1st, C. A. R. Tilt; 2nd, Baker Bros.; 3rd, A. G. H. Luxton.
Ganders, 1906, 6—1st, T. M. Shea; 2nd, Miss Mary Colwell; 3rd, A. G. H. Luxton.
Geese, 1906, 7—1st, Baker Bros.; 2nd, A. G. H. Luxton; 3rd, M. T. Burn & Son.

AYLESBURY DUCKS.

Drakes, 4—1st, H. H. Wallace; 2nd, Miss M. Colwell; 3rd, C. A. R. Tilt.
Ducks, 3—1st and 2nd, H. H. Wallace; 3rd, Miss Mary Colwell.
Drakes, 1906, 1—1st, G. J. Lawrie.
Ducks, 1906, 1—1st, G. J. Lawrie.

ROUEN DUCKS.

Drakes, 8—1st and 3rd, Baker Bros.; 2nd, G. & J. Bogue.
Ducks, 6—1st, A. Bogue; 2nd, Baker Bros.; 3rd, J. M. McCormack.
Drakes, 1906, 11—1st, A. Bogue; 2nd, G. & J. Bogue; 3rd, M. T. Burn & Son.
Ducks, 1906, 9—1st, A. Bogue; 2nd, G. & J. Bogue; 3rd, Baker Bros.

PEKIN DUCKS.

Drakes, 11—1st, T. M. Shea; 2nd, C. A. R. Tilt; 3rd, Wm. Collins.
Ducks, 11—1st and 3rd, C. A. R. Tilt; 2nd, G. J. Lawrie.
Drakes, 1906, 13—1st, G. J. Lawrie; 2nd, T. M. Shea; 3rd and 4th, C. A. R. Tilt.
Ducks, 1906, 11—1st, T. M. Shea; 2nd, C. A. R. Tilt; 3rd, G. J. Lawrie

INDIAN RUNNER DUCKS.

Drakes, 4—1st, T. H. Scott; 2nd, F. Wales; 3rd, S. D. Furminger.
Ducks, 4—1st, F. Wales; 2nd, T. H. Scott; 3rd, S. D. Furminger.
Drakes, 1906, 6—1st, T. H. Scott; 2nd, P. E. Aird; 3rd, F. Wales.
Ducks, 1906, 5—1st, T. H. Scott; 2nd, S. D. Furminger; 3rd, F. Wales.

CAYUGA DUCKS.

Drakes, 3—1st, G. & J. Bogue; 2nd, I. T. Knight; 3rd, J. H. Warrington.
Ducks, 3—1st, G. & J. Bogue; 2nd, I. T. Knight; 3rd, J. H. Warrington.
Drakes, 1906, 8—1st and 3rd, I. T. Knight; 2nd, G. & J. Bogue.
Ducks, 1906, 7—1st and 2nd, I. T. Knight; 3rd, G. & J. Bogue.

MUSCOVY DUCKS.

Drakes, 7—1st, I. T. Knight; 2nd, M. T. Burn & Son; 3rd, Baker Bros.
Ducks, 7—1st, I. T. Knight; 2nd and 3rd, M. T. Burn & Son.
Drakes, 1906, 5—1st, I. T. Knight; 2nd, M. T. Burn & Son; 3rd, Wm. J. Teale.
Ducks, 1906, 6—1st, I. T. Knight; 2nd, Baker Bros.; 3rd, W. M. Smith.

A. O. V. DUCKS.

Drakes, 5—1st, 2nd and 3rd, Roswell Goldie.
Ducks, 5—1st and 3rd, Roswell Goldie; 2nd, A. G. H. Luxton.
Drakes, 1906, 4—1st, M. T. Burn & Son; 2nd and 3rd, W. Dawson.
Ducks, 1906, 4—1st, M. T. Burn & Son; 2nd and 3rd, W. Dawson.

ENGLISH PHEASANTS.

Pair, 2—1st and 2nd, Roswell Goldie.

GOLDEN PHEASANTS.

Pair, 2—1st and 2nd, Roswell Goldie.

SILVER PHEASANTS.

Pair, 2—1st and 2nd, Roswell Goldie.

PIGEONS.

BLACK CARRIER.

Cocks, 5—1st and 2nd, Geo. J. White; 3rd, Wm. J. Teale.
Hens, 4—1st and 2nd, Geo. J. White; 3rd, W. H. Reid.

DUN CARRIER.

Cocks, 2—1st and 2nd, Geo. J. White *Hens, 2*—1st and 2nd, Geo. J. White.

A. O. S. C. CARRIER.

Cocks, 2—1st and 2nd, Geo. J. White.
Hens, 3—1st and 3rd, Geo. J. White; 2nd, W. H. Reid.

WHITE POUTER.

Cocks, 2—1st, J. A. Hatton; 2nd, J. H. Magill.
Hens, 1—1st, J. A. Hatton.

BLUE PIED POUTER.

Cocks, 3—1st, J. H. Magill; 2nd, L. Ridler; 3rd, G. J. Lawrie.
Hens, 1—1st, J. H. Magill.

BLACK PIED POUTER.

Cocks, 1—1st, J. H. Magill. *Hens, 1*—1st, J. H. Magill.

YELLOW OR RED POUTER.

Cocks, 1—1st, J. H. Magill.
Hens, 2—1st, J. H. Magill; 2nd, G. J. Lawrie.

PIGMY POUTER.

Cocks, 5—1st, R. M. Scott; 2nd and 3rd, W. H. Reid.
Hens, 4—1st, R. M. Scott; 2nd, W. H. Reid; 3rd, A. & T. Readwin

MUFFLED TUMBLER.

Cocks, 3—1st, A. & T. Readwin; 2nd, L. Ridler; 3rd, W. H. Reid.
Hens, 2—1st, L. Ridler; 2nd, W. H. Reid.

L. F. CLEAN LEG TUMBLER.

Cocks, 4—1st, F. A. Woodward; 2nd, A. & T. Readwin; 3rd, W. H. Reid.
Hens, 4—1st and 2nd, A. & T. Readwin; 3rd, F. A. Woodward.

S. F. ALMOND TUMBLER.

Cocks, 1—1st, W. H. Reid. *Hens, 1*—1st, W. H. Reid.

S. F., A. O. C. TUMBLER.

Cocks, 4—1st and 3rd, J. A. Worthy; 2nd, W. H. Reid.
Hens, 4—1st, J. A. Hatton; 2nd and 3rd, Joseph A. Worthy.

RED BARB.

Cocks, 1—1st, L. Ridler. *Hens, 1*—1st, A. & T. Readwin.

BLACK BARB.

Cocks, 3—1st and 2nd, A. & T. Readwin; 3rd, Earl Vernor.
Hens, 2—1st and 2nd, A. & T. Readwin.

A. O. S. C. BARB.

Hens, 3—1st, A. & T. Readwin; 2nd, E. Vernor; 3rd, J. A. Hatton.

WHITE TRUMPETER.

Cocks, 1—1st, W. H. Reid.

A. O. S. C. TRUMPETER.

Cocks, 3—1st, W. H. Reid; 2nd, Fred. Bell; 3rd, Hiawatha Pigeon Lofts.
Hens, 1—1st, W. H. Reid.

BLACK JACOBIN.

Cocks, 9—1st, Alfred Glenn; 2nd, A. W. Barton.
Hens, 6—1st and 2nd, A. W. Barton.

RED OR YELLOW JACOBIN.

Cocks, 12—1st, A. W. Barton; 2nd, R. K. Barker.
Hens, 8—1st, R. K. Barker; 2nd, R. M. Scott.

WHITE JACOBIN.

Cocks, 4—1st, A. W. Barton; 2nd, Alfred Glenn.
Hens, 3—1st, R. K. Barker; 2nd, A. W. Barton.

A. O. S. C. JACOBIN.

Cocks, 6—1st, J. A. Hatton; 2nd, R. K. Barker.
Hens, 4—1st, Alfred Glenn; 2nd, A. W. Barton.

ORIENTAL FRILLS.

Cocks, 4—1st, Fred. Bell; 2nd, J. A. Worthy; 3rd, W. H. Reid.
Hens, 3—1st, Fred. Bell; 2nd, W. H. Reid; 3rd, A. & T. Readwin.

R. C. ANTWERP.

Cocks, 1—1st, W. H. Reid. *Hens, 1*—1st, W. H. Reid.

SILVER DUN ANTWERP.

Cocks, 2—1st and 2nd, W. H. Reid. *Hens, 1*—1st, W. H. Reid.

WHITE FANTAIL.

Cocks, 9—1st, Fred. Hillier; 2nd, A. W. Barton.
Hens, 8—1st and 2nd, Robert Henry.

BLUE OR BLACK FANTAIL.

Cocks, 9—1st and 2nd, Robert Henry. *Hens, 8*—1st and 2nd, R. Henry.

A. O. S. C. FANTAIL.

Cocks, 5—1st, Robert Henry; 2nd, W. H. Reid.
Hens, 4—1st, A. & T. Readwin; 2nd, Robert Henry.

RED OR YELLOW MAGPIE.

Cocks, 8—1st and 2nd, R. E. McKinstry; 3rd, L. Ridler.
Hens, 7—1st, L. Ridler; 2nd and 3rd, R. E. McKinstry.

A. O. C. MAGPIE.

Cocks, 11—1st and 2nd, R. E. McKinstry; 3rd, A. & T. Readwin.
Hens, 10—1st, 2nd and 3rd, R. E. McKinstry.

BLUE OR BLACK CHEQUERED SHOW HOMER.

Cocks, 1—1st, Fred. Bell.
Hens, 2—1st, Fred. Bell; 2nd, Hiawatha Pigeon Lofts.

BLACK SWALLOW.

Cocks, 4—1st, W. H. Reid; 2nd and 3rd, L. Ridler.
Hens, 5—1st, A. & T. Readwin; 2nd, W. H. Reid; 3rd, L. Ridler.

A. O. SOL. C. SWALLOW.

Cocks, 4—1st and 2nd, W. H. Reid.
Hens, 4—1st, W. H. Reid; 2nd and 3rd, Wm. A. Jones.

A. O. C. SWALLOW.

Cocks, 6—1st, Wm. A. Jones; 2nd and 3rd, W. H. Reid.
Hens, 5—1st, Wm. A. Jones; 2nd, W. H. Reid; 3rd, L. Ridler.

DRAGOON.

Cocks, 3—1st and 3rd, Geo. J. White; 2nd, L. Ridler.
Hens, 2—1st and 2nd, Geo. J. White.

ARCHANGEL.

Cocks, 6—1st, J. A. Hatton; 2nd and 3rd, A. & T. Readwin.
Hens, 6—1st and 3rd, A. & T. Readwin; 2nd, J. A. Hatton.

NUNS.

Cocks, 6—1st, J. A. Hatton; 2nd, A. & T. Readwin; 3rd, Hiawatha Pigeon Lofts
Hens, 6—1st and 2nd, A. & T. Readwin; 3rd, J. A. Hatton.

BLUE OR SILVER AFRICAN OWLS.

Cocks, 4—1st and 2nd, F. A. Woodward.
Hens, 5—1st, F. A. Woodward; 2nd, W. H. Reid.

A. O. C. AFRICAN OWLS.

Cocks, 4—1st and 2nd, F. A. Woodward.
Hens, 4—1st and 2nd, F. A. Woodward,

BLUE OR SILVER ENGLISH OWLS.

Cocks, 4—1st, Hiawatha Pigeon Lofts; 2nd, Fred. Bell.
Hens, 3—1st, R. M. Scott; 2nd, Geo. J. White.

A. O. C. ENGLISH OWLS.

Cocks, 1—1st, A. & T. Readwin. *Hens, 1*—1st, R. M. Scott.

A. O. V. OWLS.

Cocks, 5—1st, F. A. Woodward; 2nd, J. A. Hatton.
Hens, 5—1st, J. A. Hatton; 2nd, F. A. Woodward.

Black Turbit.

Cocks, 5—1st, A. & T. Readwin; 2nd, W. H. Reid.
Hens, 6—1st, W. H. Reid; 2nd, A. & T. Readwin.

A. O. C. Turbit.

Cocks, 8—1st, Bert Sheward; 2nd, Fred. Bell.
Hens, 5—1st, Bert Sheward; 2nd, W. H. Reid.

A. O. S. V. Pigeons.

Cocks, 8—1st, A. & T. Readwin; 2nd, R. E. McKinstry.
Hens, 9—1st, J. A. Hatton; 2nd, R. E. McKinstry.

PET STOCK AND BIRDS.

Abyssinian Cavies.

Pair, 2—1st and 2nd, William Fox.

Peruvian Cavies.

Pair, 2—1st and 2nd, William Fox.

Smooth Coated Cavies.

Pair, 2—1st and 2nd, William Fox.

Dutch Rabbit.

Male, 2—1st and 2nd, William Fox. *Female, 2*—1st and 2nd, William Fox.

A. O. V. Rabbit.

Male, 6—1st and 2nd, William Fox. *Female, 5*—1st and 2nd, William Fox.

Belgian Hares.

Male, 3—1st and 2nd, William Fox. *Female, 3*—1st and 2nd, William Fox.

Scotch Fancy Canary.

Male, 2—1st and 2nd, F. W. Hodgkin *Female, 1*—1st, F. W. Hodgkin.

A. O. V. Canary.

Male, 2—1st and 2nd, F. W. Hodgkin.
Female, 2—1st and 2nd, F. W. Hodgkin.

English Goldfinch.

Male, 1—1st, F. W. Hodgkin.

Pen of Utility Fowls.

Pens, 11—1st, F. W. Krouse; 2nd, J. W. Clark; 3rd, Guy Bell

DRESSED POULTRY.

Pair Brahmas, 3—1st, 2nd and 3rd, Scanlon Bros.
Pair Cochins, 2—2nd, Samuel J. Plastow; 3rd, Scanlon Bros.
Pair Langshans, 1—2nd, Scanlon Bros.
Pair Plymouth Rock Cockerels, 14—1st, Adam A. Armstrong; 2nd, The Matthew Edwards Co.; 3rd, Scanlon Bros.; 4th, Mullock Bros.

Pair Plymouth Rock Pullets, 6—1st and 2nd, Adam A. Armstrong; 3rd and 4th, Scanlon Bros.

Pair Wyandotte Cockerels, 9—1st and 2nd, W. Howard; 3rd, Scanlon Bros.

Pair Wyandotte Pullets, 2—1st and 2nd, Scanlon Bros.

Pair Minorcas or Andalusians, 4—1st and 2nd, Scanlon Bros.; 3rd, Howard Woodrow & Son.

Pair Leghorns, 4—1st and 2nd, Scanlon Bros; 3rd, Howard Woodrow & Son.

Pair Dorkings, 5—1st, 2nd and 3rd, Scanlon Bros.

Pair Houdans, La Fleche or Creve Coeurs, 3—1st and 2nd, G. & J. Bogue; 3rd, Scanlon Bros.

Pair Game, 5—1st and 2nd, Oswald Barber; 3rd, Scanlon Bros.

Pair Javas, 1—1st, G. & J. Bogue.

Pair Hamburgs, 6—1st and 3rd, Wm. McNeil; 2nd, Scanlon Bros.

Pair Orpington Cockerels, 10—1st, W. Howard; 2nd, E. Fraleigh; 3rd, Scanlon Bros.

Pair Orpington Pullets, 5—1st, Howard Woodrow & Son; 2nd, J. W. Clark; 3rd, Scanlon Bros.

Best Pair in Class 231—1st, Adam A. Armstrong.

Turkey, any age, male, 3—1st, 2nd and 3rd, Howard Woodrow & Son.

Pair Turkeys, any age, female, 4—1st, 2nd and 3rd, Howard Woodrow & Son.

Pair Turkeys, 1906, male, 5—1st, 2nd and 3rd, Howard Woodrow & Son.

Pair Turkeys, 1906, female, 5—1st, 2nd and 3rd, Howard Woodrow & Son.

Best entry in class 232—1st, Howard Woodrow & Son.

Pair White Geese, 1906, 4—1st and 3rd, Scanlon Bros.; 2nd, Howard Woodrow & Son.

Pair Colored Geese, 1906, 6—1st, Scanlon Bros.; 2nd, F. & G. Parkin; 3rd, Howard Woodrow & Son.

Best pair in class 233—1st, Scanlon Bros.

Pair White Ducks, 1906, 8—1st and 2nd, Isaac T. Knight; 3rd, Mullock Bros.

Pair Colored Ducks, 1906, 7—1st, Isaac T. Knight; 2nd, Howard Woodrow & Son; 3rd, G. & J. Bogue.

Best pair in class 234—1st, Isaac T. Knight.

Six Brahmas, Cochins, or Langshans, 1906, 1—1st, Scanlon Bros.

Six Plymouth Rocks, or Wyandottes, 1906, 7—1st, Adam A. Armstrong; 2nd and 3rd, Scanlon Bros; 4th, The Matthew Edwards Co.

Six Minorcas, Andalusians, or Javas, 1906, 2—1st, Scanlon Bros.; 2nd, Howard Woodrow & Son.

Six Dorkings, Houdans, La Fleche, Creve Coeurs, or Orpingtons, 1906, 6—1st and 2nd, Scanlon Bros.; 3rd, J. W. Clarke.

Six Games, 1906, 2—1st, Scanlon Bros.; 2nd, Oswald Barber.

Six Leghorns or Hamburgs, 1906, 4—1st and 3rd, Scanlon Bros.; 2nd, Wm. McNeil.

Six Turkeys, 1906, 3—1st and 2nd, Howard Woodrow & Son; 3rd, Scanlon Bros.

Six Geese, 1906, 2—1st, Scanlon Bros.; 2nd, Howard Woodrow & Son.

Six Ducks, 1906, 6—1st and 2nd, Isaac T. Knight; 3rd, Howard Woodrow & Son.

Six Squabs, 1—1st, A. & T. Readwin.

One dozen Brown Eggs, heaviest and best, 1—1st, F. W. Krouse.

SELLING CLASS.

DORKINGS.

Male, 3—1st, A. G. H. Luxton; 2nd, J. M. McCormack; 3rd, F. Wales.

Female, 5—1st, A. G. H. Luxton; 2nd, J. M. McCormack; 3rd, S. J. Plastow.

PLYMOUTH ROCKS.

Male, 28—1st and 4th, J. Foster; 2nd and 5th, J. R. Boyce; 3rd, G. Bell.

Female, 11—1st, F. Wales; 2nd, J. Foster; 3rd, J. M. McCormack.

WYANDOTTES.

Male, 13—1st, J. R. Smith; 2nd, W. Lemon; 3rd, L. C. Sage.

Female, 12—1st, L. C. Sage; 2nd, W. Lemon; 3rd and 4th, J. R. Smith.

ORPINGTONS.

Male, 7—1st and 2nd, A. W. E. Hellyer; 3rd, P. E. Aird.

Female, 6—1st, P. E. Aird; 2nd, A. E. Doan; 3rd, J. S. Niven.

MINORCAS.

Male, 16—1st, 2nd and 4th, T. A. Faulds; 3rd, E. A. Rawlings.
Female, 7—1st, E. A. Rawlings; 2nd, F. Wales; 3rd, T. A. Faulds.

LEGHORNS.

Male, 9—1st, F. W. Krouse; 2nd, A. W. Graham; 3rd, Peter Gould.
Female, 2—1st, F. Wales.

FRENCH, ANY VARIETY.

Male, 7—1st, F. Wales; 2nd, G. & J. Bogue; 3rd, P. Charlton.
Female, 4—1st, G. & J. Bogue; 2nd, F. Wales; 3rd, P. Charlton.

ANY OTHER VARIETY.

Male, 16—1st, L. C. Sage; 2nd, Wm. McNeil; 3rd, G. & J. Bogue
Female, 16—1st, Wm. McNeil; 2nd, J. Baptie; 3rd, Wm. H. Pearson.

POULTRY SPECIALS.

Light Brahmas—Best hen, L. C. Sage; best pullet, Bartlett & Brown, best male, Bartlett & Brown; best collection, Bartlett & Brown.

Dark Brahmas—Best cock, L. C. Sage; best male, L. C. Sage; best female, L. C. Sage; best colored male, L. C. Sage; best collection, L. C. Sage.

Brahmas—Best male, Bartlett & Brown.

Buff Cochins—Best cock, H. Wyatt; best cockerel and pullet, H. Wyatt; best male, H. Wyatt; best colored male, H. Wyatt; best female, H. Wyatt; best collection, H. Wyatt.

Partridge Cochins—Best hen, R. Oke; best male, W. B. Nantel; best female, R. Oke; best colored male, W. B. Nantel; best collection, W. B. Nantel.

Black Cochins—Best cockerel and pullet, W. G. Murray; best male, W. G. Murray; best colored male, W. G. Murray; best female, W. G. Murray; best collection, W. G. Murray.

White Cochins—Best cockerel and pullet, A. Bogue; best colored male, W. G. Murray; best collection, W. G. Murray.

Cochins—Best male, H. Wyatt.

Black Langshans—Best cock and hen, R. McCurdy; best cockerel and pullet, C. A. R. Tilt; best collection, R. McCurdy; best cock, hen, cockerel and pullet, R. McCurdy.

White Langshans—Best cock, Wm. J. Teale; best hen, Wm. J. Teale; best cockerel, Wm. J. Teale; best pullet, J. Philpot & Son; largest and best collection, J. Philpot & Son.

A. O. C. Langshans—Best collection, Jas. Philpot & Son.

Barred Plymouth Rocks—Best cock, N. Cosh; best colored cockerel, I. K. Millard; best six cockerels, I. K. Millard; best pullet, John Pringle; best cockerel and pullet, N. Cosh; best colored male, I. K. Millard; best colored female, J. Pringle; best collection, N. Cosh; largest exhibit, N. Cosh.

White Plymouth Rocks—Best cock, J. A. Carroll; second best cock, G. E. Monroe; best hen, G. A. Robertson; best cockerel, H. H. Wallace; whitest cockerel, H. H. Wallace; best pullet, F. A. Andrews; best cockerel and pullet, F. A. Andrews; best 2 cocks, 2 hens, 2 cockerels and 2 pullets, G. E. Monroe; best cock, hen, cockerel and pullet, F. A. Andrews; best cockerel and pullet, F. A. Andrews.

Buff Plymouth Rocks—Best cockerel, J. R. Boyce; best 2 pullets, Dr. D. Marr; best male, J. R. Boyce; best female, J. A. Harron; best colored female, J. A. Harron.

Plymouth Rocks—Best market type, any color, I. K. Millard.

Golden Laced Wyandottes—Best cock, J. H. Magill; best hen, W. Lemon; best cockerel, J. MacPherson; best pullet, J. H. Magill; best collection, J. H. Magill; best shaped male, J. MacPherson; most evenly laced bird, W. Lemon.

Silver Laced Wyandottes—Best cock, Garland & Gilchrist; best hen, Garland & Gilchrist; best cockerel, J. Arthur; best pullet, Alf. Flawn; most evenly laced pullet, A. Flawn; best bird, Garland & Gilchrist.

Black Wyandottes—Best 2 cocks, R. Dinner; best cockerel, E. Wankel; best pullet, R. Dinner; best collection, R. Dinner.

Buff Wyandottes—Best pullet, A. W. Graham; best cockerel, A. W. Graham; best cock and hen, Spry & Mick; best collection, A. W. Graham.

White Wyandottes—Best two pullets, W. Dawson; best pullet, W. Dawson; best cock and hen, C. Massie; best cockerel and pullet, W. Dawson; best male, J. S. Martin; best female, W. Dawson; best collection, J. S. Martin; best shaped male, H. A. Ross; best shaped head of male, J. S. Martin; best shaped female, W. Dawson; best shaped head of female, W. Dawson; best cock, hen, cockerel and pullet, J. S. Martin; best cock, J. S. Martin; best hen, L. H. Baldwin; best cockerel, W. Dawson; best pullet, W. Dawson.

Partridge Wyandottes—Best hen, L. C. Sage; best cockerel, T. H. Scott; best pullet, A. Flawn; best pencilled pullet, L. C. Sage; best cockerel and pullet, T. H. Scott; best male, L. C. Sage.

Columbian Wyandottes—Best cockerel and pullet, T. H. Scott; best collection, T. H. Scott.

Wyandottes—Largest exhibit, any color, J. S. Martin.

Dominiques—Best cockerel, G. & J. Bogue; best male, G. & J. Bogue; best female, M. T. Burn & Son; best collection, M. T. Burn & Son.

Black Javas—Best cock, R. Oke; best hen, Richard Oke.

Mottled Javas—Best cock and hen, R. Oke; best collection, R. Oke.

Rhode Island Reds—Best 3 pullets, S. H. Smiley; best R. C. cockerel and pullet, S. H. Smiley; best collection, S. H. Smiley; best collection, single comb, S. H. Smiley.

Black Red Games—Best cock, W. H. Butler; best collection, W. H. Butler.

Brown Red Games—Best hen, W. Barber; best collection of old birds, W. Barber.

Duckwing Games—Best cock, W. Barber; best hen, W. Barber; best cockerel, J. Philpot & Son; best pullet, W. Barber.

Pyle Games—Best cockerel and pullet, J. Parkinson; best cock, hen, cockerel and pullet, J. Parkinson; best collection, J. Parkinson.

Cornish Indian Games—Best hen, C. LaRose; best cockerel, Topping & Finchamp; best 2 cockerels, Topping & Finchamp; best pullet, Topping & Finchamp.

White Indian Games—Best hen, Wm. J. Teale.

Black Sumatra Games—Best 2 cockerels, Fred. D. King.

Birchen Games—Best cock, W. Barber; best 2 hens, Wm. J. Teale.

R. C. White Leghorns—Best cockerel, R. Oke; best collection, W. J. Bell; best hen, W. J. Bell; best cockerel, M. R. Hoover; best colored male, M. R. Hoover; best shaped male, M. R. Hoover; best colored female, W. J. Bell; best shaped female, W. J. Bell; best collection of not less than six birds, W. J. Bell.

S. C. White Leghorns—Best cockerel, W. Ferguson; best headed cockerel, W. Ferguson; best 3 pullets, W. Ferguson; best male, W. Ferguson; best cock, hen, cockerel and pullet, W. Ferguson; best hen, F. Wales; best cockerel, W. Ferguson; best colored male, Dr. R. C. Coates; best shaped male, W. Ferguson; best colored female, F. Wales; best shaped female, F. Wales; best collection of not less than six birds, W. Ferguson; best collection, W. Ferguson.

Black Leghorns—Best cock and hen, A. C. Doan; best collection, W. M. Osborne; best hen, A. C. Doan; best colored male, A. C. Doan; best shaped male, A. C. Doan, best colored female, A. C. Doan; best shaped female, A. C. Doan; best collection of not less than six birds, W. M. Osborne.

R. C. Brown Leghorns—Best cock, W. C. Wilson & Son; best cockerel, H. R. K. Tozer; best collection, Wm. Cadman; best hen, W. Cadman; best 3 hens, W. Cadman; best colored male, H. R. K. Tozer; best shaped male,, H. R. K. Tozer; best headed male, H. R. K. Tozer; best cockerel, H. R. K. Tozer; best colored female, W. Cadman; best shaped female, W. Cadman; best headed female, W. Cadman; best cock and cockerel, W. C. Wilson & Son; best 2 cocks, 2 hens, 2 cockerels and 2 pullets, W. Cadman; best trio, old, W. Cadman; best collection of not less than six birds, W. Cadman.

S. C. Brown Leghorns—Two cocks with best saddle striping, H. F. Becker; best cockerel, W. A. Gurney; best pullet, W. A. Gurney; best 3 cockerels and 3 pullets, W. A. Gurney; best collection, H. F. Becker; best hen, G. G. Henderson; best combed cockerel, H. F. Becker; cockerel with best laced saddle, H. F. Becker; pullet with best neck, H. F. Becker; best 3 cocks and 3 cockerels, H. F. Becker; best colored male, H. F. Becker; best shaped male, J. Bradley; best colored female, W. A. Gurney; best shaped female, G. G. Henderson; six best colored females, G. G. Henderson; 6 females with best colored backs, G. G. Henderson; best collection of not less than six birds, H. F. Becker.

S. C. Buff Leghorns—Best cock, N. K. Cornwall; best hen, J. Dundas.

Buff Leghorns—Best cockerel, N. K. Cornwall; best pullet, N. K. Cornwall; best 2 pullets, N. K. Cornwall; best cockerel and pullet, N. K. Cornwall; best collection, N. K. Cornwall.

Leghorns—Largest exhibit of any one variety, H. F. Becker; best cock, hen, cockerel and pullet, H. F. Becker.

Buff Leghorns—Best hen, N. K. Cornwall; best colored male, N. K. Cornwall; best shaped male, N. K. Cornwall; best colored female, N. K. Cornwall; best shaped female, N. K. Cornwall; best collection of not less than six birds, N. K. Cornwall.

Spanish—Best collection, G. & J. Bogue.

S. C. Black Minorcas—Best cockerel, J. H. Minshall.

R. C. Black Minorcas—Best collection, J. H. Minshall.

Black Minorcas—Best pullet, H. Dunne; best cock, hen, cockerel and pullet, H. Dunne.

Best collection of R. C. and S. C. Black Minorcas—J. H. Minshall.

Andalusians—Best cock, G, Howard; best hen, I. T. Knight; best cockerel, C. Richardson; best pullet, C. LaRose.

Silver Grey Dorkings—Best two cocks, R. Goldie; best cock and hen, E. B. Palmer.

Colored Dorkings—Best cock and hen, J. H. Warrington; best collection, James M. McCormack.

White Dorkings—Best collection, Allen Bogue.

Dorkings—Best collection, J. H. Warrington.

S. C. Buff Orpingtons—Best S. C. hen and pullet showing least foreign color in plumage, Clark & Barnes (tie).

Buff Orpingtons—Best cock, C. M. Blyth; best hen, J. W. Clark; best cockerel, J. W. Clark; best 4 cockerels, J. W. Clark; best pullet, R. Barnes; best collection, J. W. Clark; best cockerel, J. W. Clark; best 4 Orpingtons, cock, hen, cockerel and pullet, J. W. Clark. Cock—1st prize, C. M. Blyth; 2nd prize, A. W. E. Hellyer; 3rd prize, W. Dawson. Hen—1st, J. W. Clark; 2nd, J. W. Clark; 3rd, C. M. Blyth. Cockerel—1st, J. W. Clark; 2nd, P. E. Aird; 3rd, A. W. E. Hellyer. Pullet —1st, R. Barnes; 2nd, R. Barnes; 3rd, R. Barnes. Best male, J. W. Clark; best female, R. Barnes; cock, hen, cockerel and pullet, J. W. Clark.

S. C. Black Orpingtons—Best hen, H. A. Hoffman; best cockerel, E. A. Rawlings; best 2 pullets, C. J. Daniels.

Black Orpingtons—Best colored cock, H. J. Hurd; best 4 hens, H. A. Hoffman; best 4 cockerels, H. A. Hoffman; best 4 pullets, H. A. Hoffman; best cockerel and pullet, C. J. Daniels; best cock, H. A. Hoffman; best hen, H. A. Hoffman; best cockerel, M. H. Stroh; best pullet, C. J. Daniels; best male, H. A. Hoffman; best female, H. A. Hoffman.

White Orpingtons—Best cock, W. A. Roberts; best hen, W. Dawson: best cockerel, W. A. Roberts; best pullet, W. A. Roberts; best male, W. A. Roberts; best female, W. Dawson.

Orpingtons—Largest exhibit in any one variety, H. A. Hoffman.

Houdans—Best cock, G. J. Lawrie; best collection, G. & J. Bogue.

Creve Cœurs—Best cockerel and pullet, G. & J. Bogue; best collection, G. & J. Bogue.

LaFleche—Best cockerel and pullet, R. Oke; best collection, G. & J. Bogue.

W. C. B. Polands—Best male, W. McNeil; best cock, hen, cockerel and pullet, Wm. McNeil; best collection, Wm. McNeil.

Golden Polands—Best cock, hen, cockerel and pullet, Wm. McNeil; best collection, Wm. McNeil.

Silver Polands—Best cock, hen, cockerel and pullet, A. Bogue; best collection, A. Bogue.

White Polands—Best cock, hen, cockerel and pullet, Wm. McNeil.

Golden Bearded Polands—Best cock, hen, cockerel and pullet, Wm. McNeil.

Silver Bearded Polands—Best male, G. & J. Bogue; best female, A. Bogue; best cock, hen, cockerel and pullet, G. & J. Bogue; best collection, G. & J. Bogue.

White Bearded Polands—Best cock, hen, cockerel and pullet, Wm. McNeil.

Buff-Laced Polands—Best cock, hen, cockerel and pullet, G. & J. Bogue; best collection, G. & J. Bogue.

Golden Spangled Hamburgs—Best male, R. Oke; best female, R. Oke; best collection, R. Oke.

Silver Spangled Hamburgs—Best cock and hen, Wm. Cadman; best collection, Richard Oke.

Golden Pencilled Hamburgs—Best male, R. Oke; best female, R. Oke; best collection, R. Oke.

Silver Pencilled Hamburgs—Best cock, W. C. Wilson & Son; best hen, R. Oke; best collection, R. Oke.

Black Hamburgs—Best cock, R. Oke; best hen, R. Oke; best cockerel and pullet, R. Oke; best collection, R. Oke.

Red Caps—Best cock, E. Wells, Jr.; best hen, J. H. Warrington; best cockerel, W. E. Wright; best pullet, G. & J. Bogue; best collection, E. Wells, Jr.

Sultans—Best cock and hen, R. Oke; best collection, R. Oke.

Silkies—Best cock and hen, H. B. Donovan; cockerel and 2 pullets, shown by youngest exhibitor in this class, T. Saunders.

Silver Pencilled Wyandottes—Best cock, Bartlett & Brown; best collection, Bartlett & Brown.

Yokahoma—Best cockerel and pullet, C. Schelter.

Black Red Game Bantams—Best cock, C. R. Crowe; best hen, C. R. Crowe; best cockerel, Rook Bros.; best pullet, C. R. Crowe; largest exhibit, C. R. Crowe.

Brown Red Game Bantams—Best cock, W. Barber; best hen, W. Barber; best cockerel, Tyson & McMaster; best pullet, Rook Bros.; best 3 pullets, Tyson & McMaster.

Duckwing Game Bantams—Best cock, J. Crowe; best hen, J. Crowe; best cockerel, W. Barber; best pullet, J. Crowe.

Pyle Game Bantams—Best cock, T. Bower; best hen, Tyson & McMaster; best cockerel, T. Bower; best pullet, Hart & Grimoldby; best collection, Tyson & McMaster; largest collection, Tyson & McMaster.

White Game Bantams—Best collection, H. B. Donovan.

Birchen Game Bantams—Best hen, H. B. Donovan.

Game Bantams—Best game bantam, cockerel or pullet, any color, Rook Bros.

A. O. V. Game Bantams—Best two pullets, Tyson & McMaster.

Golden Sebright Bantams—Best male, R. Oke; best female, R. Oke; best collection, R. Oke; best bird shown by new exhibitor, T. J. Kiley.

Silver Sebright Bantams—Best collection, R. Oke.

Black Rose Comb Bantams—Best cock, Doidge & McNeil; best hen, H. B. Donovan; best cockerel, W. G. Murray; best pullet, W. G. Murray; best collection, R. Oke.

White Rose Comb Bantams—Best cockerel, R. Oke; best collection, W. G. Murray.

White Cochin Bantams—Best cock, hen, cockerel and pullet, J. R. Boyce; best collection, J. R. Boyce.

Buff Cochin Bantams—Best male, J. R. Boyce; best female, J. R. Boyce; best cock, hen, cockerel and pullet, J. R. Boyce; best collection, J. R. Boyce.

Black Cochin Bantams—Best cock, Doidge & McNeil; best hen, Doidge & McNeil; best pullet, F. M. Briggs; best cockerel and pullet, Doidge & McNeil; best collection, Doidge & McNeil.

Partridge Cochin Bantams—Best 3 cocks, R. & I. Graham; best 3 hens, Wm. C. Wilson & Son; best cockerel, Wm. C. Wilson & Son; best pullet, H. R. K. Tozer.

White Booted Bantams—Best cock, T. J. Kiley; best hen, T. J. Kiley; best cockerel, T. J. Kiley; best pullet, Wm. J. Teale.

Japanese Black-tailed Bantams—Best collection, Richard Oke.

White Japanese Bantams—Best male, R. Oke; best female, W. G. Murray.

Black Japanese Bantams—Best male, R. Oke; best female, H. B. Donovan.

Polish Bearded Bantams—Best collection, W. G. Murray.

Polish Unbearded Bantams—Best collection, W. G. Murray.

Brahma Bantams—Best cock, R. S. Dickie; best collection, H. B. Donovan.

Frizzle Bantams—Best pair, T. J. Kiley.

Bronze Turkeys—Best shaped male, W. J. Bell; best female, W. J. Bell; best year old hen, W. J. Bell; best 2 females, old, and 2 females, young, W. J. Bell.

White Turkeys—Best male, W. H. Beattie; best pair old females, W. H. Beattie.

A. O. V. Turkeys—Best male, Baker Bros.

Toulouse Geese—Best male, Miss Mary Colwell; best female, M. T. Burn & Son; best collection, Scanlon Bros.

Embden Geese—Best old male, Miss Mary Colwell; best male of 1906, Miss Mary Colwell; best old female, Miss Mary Colwell; best female of 1906, Miss Mary Colwell.

Aylesbury Ducks—Best pair, H. H. Wallace.

Rouen Ducks—Best young pair, A. Bogue; best old pair, Baker Bros.; best collection, A. Bogue.

Pekin Ducks—Best 2 drakes, T. M. Shea; best old pair, C. A. R. Tilt; best collection, C. A. R. Tilt.

Indian Runner Ducks—Best 3 young males, T. H. Scott; best old pair, T. H. Scott; best collection, T. H. Scott.

Cayuga Ducks—Best collection, I. T. Knight.

Colored Muscovy Ducks—Best collection, I. T. Knight.

White Muscovy Ducks—Best old drake, M. T. Burn & Son; best young drake, W. J. Teale; best old duck, M. T. Burn & Son; best young duck, W. M. Smith; best collection, Wm. J. Teale.

Wood Ducks—Best collection, Roswell Goldie.

Toulouse Geese—Best collection, Scanlon Bros.

Embden Geese—Best collection, Miss Mary Colwell.

A. O. V. Geese—Best collection, Baker Bros.

White Ducks—Best collection, C. A. R. Tilt.

Colored Ducks—Best collection, G. & J. Bogue.

Water Fowl—Best male, any age, Miss Mary Colwell.
English Pheasants—Best pair, R. Goldie.
Golden Pheasants—Best pair, R. Goldie.
Silver Pheasants—Best pair, R. Goldie.

PIGEONS.

Best Black Carrier Cock—G. J. White.
Best Carrier in Show—G. J. White.
Best collection of Pouters—J. H. Magill.
Best Long Faced Tumbler, any color or age—A. & T. Readwin.
Best collection of Tumblers—W. H. Reid.
Best Red Jacobin Cock—A. W. Barton.
Best Jacobin—A. W. Barton.
Best collection of Jacobins, any color—A. W. Barton.
Best exhibit of Short Faced Antwerps—W. H. Reid.
Best collection of Antwerps, any color—W. H. Reid.
Best Blue and Black Fantail, Cock or Hen—Robert Henry.
Best Fantail—Robert Henry.
Best Show Homer—Fred. Bell.
Best Archangel Hen—A. & T. Readwin.
Best four Archangels—A. & T. Readwin.
Best African Owl—F. A. Woodward.
Best Owl, any variety or age—F. A. Woodward.
Best A. O. V. Owl Hen—J. A. Hatton.
Best A. O. V. Owl Cock—F. A. Woodward.
Best Black Turbit Cock and Hen—W. H. Reid.
Best A. O. C. Turbit—Bert Sheward.
Best Cock Pigeon in Show—R. E. McKinstrey.
Best Hen Pigeon in Show—R. E. McKinstrey.
Best White Fantail Cock—Robert Henry.
Best White Fantail Hen—Robert Henry.
Best Blue Fantail Cock—Robert Henry.
Best Blue Fantail Hen—Robert Henry.
Best A. O. V. Fantail Cock—Robert Henry.
Best A. O. V. Fantail Hen—A. & T. Readwin.
Best Black Carrier Cock—Wm. J. Teale.
Best Black Carrier Hen—Wm. J. Teale.
Best Black Barb Cock—A. & T. Readwin.
Best Black Barb Hen—A. & T. Readwin.
Best A. O. V. Barb Cock—Not awarded.
Best A. O. V. Barb Hen—A. & T. Readwin.
Best Red or Yellow Magpie Hen—L. Ridler.
Best Red or Yellow Magpie Hen—L. Riddler.
Best A. O. V. Magpie Cock—A. & T. Readwin.
Best A. O. V. Magpie Hen—A. & T. Readwin.
Best Archangel Cock—J. A. Hatton.
Best Archangel Hen—A. & T. Readwin.
Best Black Turbit Cock—A. & T. Readwin.
Best Black Turbit Hen—A. & T. Readwin.
Best African Owl Cock—F. A. Woodward.
Best African Owl Hen—F. A. Woodward.
Best Black Chinese Owl Cock—F. A. Woodward.
Best Black Chinese Owl Hen—F. A. Woodward.
Best Tumbler Cock—A. & T. Readwin.
Best Tumbler Hen—A. & T. Readwin.
Best A. O. S. V. Cock—A. & T. Readwin.
Best 2nd prize Pigeon in Show—Robert Henry.
Best collection of Pigeons—W. H. Reid.
Largest entry in Pigeons—W. H. Reid.
Smooth Coated Cavies—Best collection, William Fox.
Rabbits—Best white male, Mitchell & McGrogan; best white female, L. Ridler.
Hares—Best collection Belgian hares and rabbits, Wm. Fox; best collection Belgian hares, Wm. Fox.

COLLECTION PRIZES.

Best display of 6 Ducks, 1906, dressed—Howard Woodrow & Sons.

Guineas—Best exhibit of Pearl or White—1st, Miss Elsie Davidson; 2nd, W. M. Smith.

Best White Fowl—J. S. Martin.

Best four birds, cock, hen, cockerel and pullet, in Barred Plymouth Rocks, Light Brahmas, or Single Comb Brown Leghorns—N. Cosh; largest and best collection, R. Oke.

Best pen of utility fowls—F. W. Krouse.

Best collection of White Plymouth Rocks and White Wyandottes—Daly & Dill.

Best collection of Asiatics—W. G. Murray.

Best collection of Brown Red and Birchen Game Bantams—W. Barber.

Largest entry in any one variety of Game Bantams—Tyson & McMaster.

Largest entry in any one variety of Ornamental Bantams—Doidge & McNeil.

Largest entry in any one variety of Poultry, excepting Bantams—J. S. Martin.

Second largest entry in any one variety of Poultry, excepting Bantams—Newton Cosh.

Largest exhibit in Turkeys—W. H. Beattie.

Largest exhibit in Water Fowl—Baker Bros.

Youngest exhibitor at the Show—Teddie Saunders.

THE EASTERN ONTARIO LIVE STOCK AND POULTRY SHOW, OTTAWA, 1907.

CATTLE.

SHORTHORNS.

Steer, 2 years and under 3.—1st, 2nd and 4th, Shortreed & Armstrong, Fergus; 3rd, R. Reid & Co., Hintonburg.

Steer, 1 year and under 2.—1st, 3rd and 4th, Shortreed & Armstrong; 2nd, R. Reid & Co.

Steer, under 1 year.—1st, Shortreed & Armstrong; 2nd, R. Reid & Co.

Cow or Heifer, 3 years and over.—1st, Shortreed & Armstrong; 2nd, Jas. Leask, Greenbank.

Heifer, 2 years and under 3.—1st, Peter White, Renfrew; 2nd, Shortreed & Armstrong.

Heifer, under 2 years.—1st, Peter White; 2nd, James Leask.

HEREFORDS AND ABERDEEN-ANGUS.

Steer or Heifer 2 years and under 3.—1st, Shortreed & Armstrong.

Steer or Heifer, 1 year and under 2.—1st, Shortreed & Armstrong.

Steer or Heifer, under 1 year.—1st and 2nd, Shortreed & Armstrong.

Steer or Heifer, 3 years or over.—1st, Shortreed & Armstrong.

GALLOWAYS AND DEVONS.

Steer or Heifer, 2 years and under 3.—1st, D. McCrae, Guelph.

Steer or Heifer, 1 year and under 2.—1st and 2nd, D. McCrae.

Steer or Heifer, under 1 year.—1st, D. McCrae.

Cow or Heifer, 3 years or over.—1st, D. McCrae.

GRADES OR CROSSES.

Steer, 2 years and under 3.—1st and 2nd, James Leask; 3rd, Shortreed & Armstrong; 4th, R. Reid & Co.

Steer, 1 year and under 2.—1st and 2nd, Jas. Leask; 3rd, Shortreed & Armstrong; 4th, R. Reid & Co.

Steer, under 1 year.—1st and 2nd, Jas. Leask; 3rd, R. Reid & Co.

Cow or Heifer, 3 years or over.—1st and 2nd, Shortreed & Armstrong; 3rd, Jas. Leask; 4th, R. Reid & Co.

Heifer, 2 years and under 3.—1st, Jas. Leask; 2nd, Shortreed & Armstrong; 3rd, Jas. W. Barnett, Brooklin.

Heifer, under 2 years.—1st and 2nd, Jas. Leask; 3rd, Shortreed & Armstrong.

DRESSED CARCASSES.

Pure-breds.—1st, 2nd and 3rd, Shortreed & Armstrong; 4th and 5th, R. Reid & Co.

Grades.—1st, 3rd and 4th, Shortreed & Armstrong; 2nd, Jas. Leask; 5th, Jas. W. Barnett.

EXPORT STEERS.

Three Export Steers.—1st and 2nd, Shortreed & Armstrong; 3rd and 4th, R. Reid & Co.

Special Grade Steer sired by Pure-bred Shorthorn Bull.—1st, 2nd, 3rd and 4th, Jas. Leask.

DAIRY TEST.

Name of Cow and Owner.	Lbs. of Milk.	% Fat.	Lbs. Fat.	Lbs. Solids, not Fat.	Points for Days in Milk.	Points for Fat.	Points for Solids, not Fat.	Total Points.
Class 28, Section 1—Holstein Cow, 42 months and over—								
1st, Lady Colantha de Kol, N. Sangstsr, Ormstown, Que	134.7	3.1	4.17	11.62	.90	83.40	46.48	130.78
2nd, Midlummer of Maple Grove, N. Sangster, Ormstown, Que	141.6	2.8	3.96	12.49	....	79.20	49.96	129.16
3rd, Boutje Paul, N. Sangster, Ormstown, Que	135.5	2.9	3.93	11.98	....	78.60	47.92	126.52
Class 30, Section 1—Grade Cow, 42 months and over—								
1st, Roan, Reid & Co., Ottawa	111.3	3.2	3.56	9.52	.30	71.20	38.08	109.58
2nd, Pale Face, Reid & Co., Ottawa	95.3	3.7	3.53	8.58	3.40	71.60	34.32	109.32
3rd, Jane, T. A. Spratt, Billings Bridge	74.2	3.6	2.67	6.48	10.10	53.40	25.92	89.42
4th, Flora, T. A. Spratt, Billings Bridge	71.7	4.0	2.87	5.79	8.30	57.40	23.16	88.86
Class 30, Section 2—Grade Heifer, under 42 months—								
1st, Maggie, N. Sangster, Ormstown, Que	87.1	2.6	2.26	7.43	....	54.20	29.72	83.92
2nd, Gip, T. A. Spratt, Billings Bridge	77.9	3.2	2.49	6.92	2.60	49.80	27.68	80.08
3rd, Minnie, Reid & Co., Ottawa	76.8	3.4	2.61	6.67	....	52.20	26.68	78.88
4th, Tena, N. Sangster, Ormstown, Que	76.7	2.9	2.22	6.78	....	44.40	27.10	71.50

SHEEP.

COTSWOLDS.

Wether, 1 year and under 2.—1st and 2nd. S. J. Lyons, Norval.
Wether, under 1 year.—1st, 2nd and 3rd, S. J. Lyons.
Three Wethers, under 1 year.—1st, S. J. Lyons.
Ewe, under 1 year.—1st, 2nd and 3rd, S. J. Lyons.
Dressed Carcass Wether, under 1 year.—1st, S. J. Lyons.

LINCOLNS.

Wether, 1 year and under 2.—1st, Leonard Parkinson, Eramosa.
Wether, under 1 year.—1st, 2nd and 3rd. Leonard Parkinson.
Three Wethers, under 1 year.—1st and 2nd, Leonard Parkinson.
Ewe, under 1 year.—1st, 2nd and 3rd, Leonard Parkinson.
Dressed Carcass Wether, under 1 year.—1st and 2nd, Leonard Parkinson.

LEICESTERS.

Wether, 1 year and under 2.—1st, Leonard Parkinson, Eramosa.
Wether, under 1 year.—1st, 2nd and 3rd, G. & W. Parkinson, Eramosa.
Three Wethers, under 1 year.—1st, G. & W. Parkinson.
Ewe, under 1 year.—1st and 2nd, G. & W. Parkinson.
Dressed Carcass Wether, under 1 year.—1st, G. & W. Parkinson.

OXFORDS.

Wether, under 1 year.—1st, 2nd and 3rd, W. E. Wright, Glanworth.
Three Wethers, under 1 year.—1st, W. E. Wright.
Dressed Carcass Wether, under 1 year.—1st, W. E. Wright.

SHROPSHIRES.

Wether, 1 year and under 2.—1st, Lloyd-Jones Bros., Burford.

Wether, under 1 year.—1st and 2nd, W. E. Wright; 3rd, 4th and 5th, Lloyd-Jones Bros.

Three Wethers, under 1 year.—1st, W. E. Wright; 2nd, Lloyd-Jones Bros.

Ewe, under 1 year.—1st and 3rd, Lloyd-Jones Bros.; 2nd, W. E. Wright.

Dressed Carcass Wether, under 1 year.—1st, W. E. Wright; 2nd and 3rd, Lloyd-Jones Bros.; 4th, A. G. H. Luxton, Milton West.

SOUTHDOWNS.

Wether, 1 year and under 2.—1st, J. Jackson & Son, Abingdon; 2nd and 3rd, Telfer Bros., Paris.

Wether, under 1 year.—1st, 4th and 5th, Telfer Bros.; 2nd and 3rd, John Jackson & Sons.

Three Wethers, under 1 year.—1st, Telfer Bros.

Ewe, under 1 year.—1st, 2nd and 3rd, Telfer Bros.; 4th, John Jackson & Sons.

Dressed Carcass Wether, under 1 year.—1st, John Jackson & Sons; 2nd, Telfer Bros.

DORSET HORNS.

Wether, 1 year and under 2.—1st, R. H. Harding, Thorndale.
Wether, under 1 year.—1st, 2nd and 3rd, R. H. Harding.
Three Wethers, under 1 year.—1st, R. H. Harding.
Ewe, under 1 year.—1st, 2nd and 3rd, R. H. Harding.
Dressed Carcass Wether, under 1 year.—1st, R. H. Harding.

HAMPSHIRES AND SUFFOLKS.

Wether, 1 year and under 2.—1st, Telfer Bros., Paris.
Wether, under 1 year.—1st, Telfer Bros.
Ewe, under 1 year.—1st and 2nd, Telfer Bros.

GRADES AND CROSSES.

Wether, 1 year and under 2.—1st, Lloyd-Jones Bros., Burford.

Three Wethers, under 1 year.—1st, Leonard Parkinson; 2nd, Lloyd-Jones Bros.; 3rd, A. G. H. Luxton.

Wether, under 1 year.—1st and 4th, Leonard Parkinson; 2nd, 3rd and 5th, Lloyd-Jones Bros.

Dressed Carcass Wether, under 1 year.—1st, W. E. Wright; 2nd and 3rd, Lloyd-Jones Bros.; 4th, A. G. H. Luxton.

SWINE.

BERKSHIRES.

Barrow, 6 months and under 9.—1st and 2nd, S. J. Lyons, Norval.

Barrow, under 6 months.—1st, 2nd and 3rd, S. J. Lyons.

Sow, 6 months and under 9.—1st and 2nd, S. J. Lyons; 3rd and 4th, R. Reid & Co.

Sow, under 6 months.—1st, 2nd and 3rd, S. J. Lyons; 4th and 5th, R. Reid & Co.

YORKSHIRES.

Barrow, 6 months and under 9.—1st and 2nd, Joseph Featherston & Son, Streetsville; 3rd and 4th, J. E. Brethour, Burford.

Barrow, under 6 months.—1st and 2nd, Joseph Featherston & Son; 3rd and 4th, J. E. Brethour; 5th, David Barr, Jr., Renfrew.

Sow, 6 months and under 9.—1st and 4th, J. E. Brethour; 2nd and 3rd, Joseph Featherston & Son.

Sow, under 6 months.—1st and 4th, J. E. Brethour; 2nd and 3rd, Jos. Featherston & Son.

TAMWORTHS.

Barrow, 6 months and under 9.—1st, 2nd and 3rd, R. Reid & Co.

Barrow, under 6 months.—1st, 2nd, 3rd and 4th, R. Reid & Co.

Sow, 6 months and under 9.—1st, 2nd, 3rd and 4th, R. Reid & Co.

Sow, under 6 months.—1st, 2nd, 3rd and 4th, R. Reid & Co.

CHESTER WHITES.

Barrow, 6 months and under 9.—1st, 2nd, 3rd and 4th, Robert Clark, Ottawa.

Barrow, under 6 months.—2nd, 3rd and 4th, Robert Clark.

Sow, 6 months and under 9.—1st, Robert Clark.

Sow, under 6 months.—1st, 2nd and 3rd, Robert Clark.

GRADES AND CROSSES.

Barrow, 6 months and under 9.—1st, Jos. Featherston & Son; 2nd and 3rd, H. Stuart, Burford.

Barrow, under 6 months.—1st and 3rd, Jos. Featherston & Son; 2nd, H. Stuart.

Sow, 6 months and under 9.—1st and 2nd, Jos. Featherston & Son; 3rd and 4th, H. Stuart.

Sow, under 6 months.—1st and 2nd, H. Stuart; 3rd and 4th, Jos. Featherston & Son.

EXPORT BACON HOGS, ALIVE.

Three Pure-breds.—1st, 3rd and 7th, J. E. Brethour; 2nd, 4th and 8th, Jos. Featherston & Son; 5th, David Barr, Jr.; 6th and 9th, R. Reid & Co.

Three Grades or Crosses.—1st and 4th, H. Stuart; 2nd and 5th, Jos. Featherston & Son; 3rd, Robert Clark.

Three Best Export Bacon Hogs.—1st, J. E. Brethour.

EXPORT BACON HOGS, DRESSED CARCASSES.

Three Pure-breds.—1st and 9th, J. E. Brethour; 2nd and 3rd, R. Reid & Co.; 4th and 5th, David Barr, Jr.; 6th and 7th, Jos. Featherston & Son; 8th, David Barr, Jr.

Three Grades or Crosses.—1st and 2nd, H. Stuart; 3rd, Robert Clark; 4th and 5th, Jos. Featherston & Son.

Three Best Bacon Hogs.—1st, J. E. Brethour.

Wiltshire Bacon Hogs, Best Pen of 4 Hogs, any breed, pure-bred or cross, each hog exhibited to weigh not less than 170 pounds, and not more than 200.—1st, J. E. Brethour; 2nd, Jos. Featherston & Son; 3rd, Robert Clark.

SEED DEPARTMENT.

FALL WHEAT.

1st, C. R. Gies, Heidelberg.
2nd, Jas. Snetsinger, Eamer's Corners.

SPRING WHEAT.

1st, Samuel J. Woods, Metcalfe.
2nd, D. Cumming, Russell.
3rd, G. R. Bradley, Carsonby.
4th, Wm. Mulligan, Merivale.

BANNER OATS.

1st, Geo. Boyce, Merivale.
2nd, S. J. Woods, Metcalfe.
3rd, H. Simmons, Speedside.
4th, G. R. Bradley, Carsonby.

OATS, ANY OTHER VARIETY.

1st, Jas. Snetsinger, Eamer's Corners.
2nd, Wm. Shields, Eamer's Corners.
3rd, J. H. Voisin, St. Clements.
4th, G. R. Bradley, Carsonby.

BARLEY, SIX-ROWED.

1st, Wm. Mulligan, Merivale.
2nd, G. R. Bradley, Carsonby.
3rd, D. Cumming, Russell.
4th, Geo. Boyce, Merivale.

SMALL FIELD PEAS.

1st, Jas. Snetsinger, Eamer's Corners.
2nd, S. J. Woods, Metcalfe
3rd, A. Petrie, Fergus.
4th, D. Cumming, Russell

POTATOES, ROSE TYPE.

1st, Geo. R. Bradley, Carsonby.
2nd, Jas. Snetsinger, Eamer's Corners.
3rd, Wm. Shields, Eamer's Corners.

POTATOES, BEST EARLY VARIETY OTHER THAN ROSE TYPE.

1st, Wm. Shields, Eamer's Corners.
2nd, S. J. Woods, Metcalfe.
3rd, Jas. Snetsinger, Eamer's Corners.

POTATOES, WHITE.

1st, George R. Bradley, Carsonby.
2nd, Wm. Shields, Eamer's Corners.
3rd, Jas. Snetsinger, Eamer's Corners.

INDIAN CORN, BEST FOR ENSILAGE IN OTTAWA VALLEY.

1st, Jas. Snetsinger, Eamer's Corners.
2nd, D. Cumming, Russell.
3rd, Edward Baker, Winchester.

TIMOTHY SEED.

1st, D. Cumming, Russell.
2nd, Neil Sangster, Ormstown, Que.

POULTRY.

List gives number of entries and awards in each section. For post office address of exhibitors see page 270.

LIGHT BRAHMAS.

Cocks, 4.—1st and 3rd, W. B. Nantel; 2nd, Galt E. Brown.
Hens, 6.—1st and 2nd, John A. Belford; 3rd, W. B. Nantel.
Cockerels, 8.—1st and 3rd, W. B. Nantel; 2nd, Dr. J. Pritchard.
Pullets, 7.—1st and 2nd, W. B. Nantel; 3rd, John A. Belford.

DARK BRAHMAS.

Cocks, 4.—1st and 2nd, Lew Sage; 3rd, W. B. Nantel.
Hens, 5.—1st and 2nd, Lew Sage; 3rd, W. B. Nantel.
Cockerels, 5.—1st and 2nd, W. B. Nantel; 3rd, Lew Sage.
Pullets, 4.—1st and 2nd, Lew Sage; 3rd, W. B. Nantel.

BUFF COCHINS.

Cocks, 2.—1st, W. B. Nantel; 2nd, Dr. J. Pritchard.
Hens, 4.—1st, W. B. Nantel; 2nd, Morley Peaker; 3rd, J. H. Williams.
Cockerels, 8.—1st and 2nd, W. B. Nantel; 3rd, Tooker & Bowey.
Pullets, 5.—1st and 2nd, W. B. Nantel; 3rd, Tooker & Bowey.

PARTRIDGE COCHINS.

Cocks, 2.—1st, Richard Oke; 2nd, W. B. Nantel.
Hens, 3.—1st, Richard Oke; 2nd, Tooker & Bowey.
Cockerels, 4.—1st, Wm. C. Wilson & Sons; 2nd and 3rd, W. B. Nantel.
Pullets, 4.—1st and 3rd, W. B. Nantel; 2nd, Richard Oke.

BLACK COCHINS.

Cocks, 1.—1st, W. G. Murray.
Hens, 2.—1st, W. G. Murray; 2nd, W. B. Nantel.
Cockerels, 1.—1st, W. G. Murray.
Pullets, 2.—1st, W. G. Murray; 2nd, W. B. Nantel.

WHITE COCHINS.

Cocks, 3.—1st, W. B. Nantel; 2nd, W. G. Murray; 3rd, J. H. Williams.
Hens, 3.—1st, W. B. Nantel; 2nd, W. G. Murray; 3rd, J. H. Williams.
Cockerels, 3.—1st, W. B. Nantel; 2nd, W. G. Murray; 3rd, Tooker & Bowey.
Pullets, 3.—1st, W. B. Nantel; 2nd, W. G. Murray; 3rd, Tooker & Bowey.

LANGSHANS.

Cocks, 2.—1st and 2nd, R. McCurdy.
Hens, 4.—1st, J. Burgess; 2nd and 3rd, R. McCurdy.
Cockerels, 3.—1st and 2nd, R. McCurdy; 3rd, J. Burgess.
Pullets, 3.—1st and 2nd, R. McCurdy; 3rd, J. Burgess.

BARRED PLYMOUTH ROCKS.

Cocks, 8.—1st, M. C. Neate; 2nd, Garland & Gilchrist; 3rd, F. A. James; 4th, Alex. Dynes.

Hens, 13.—1st and 2nd, Frank W. Beckstead; 3rd, M. C. Neate; 4th, J. A. Lambertus.

Cockerels, 20.—1st, Frank W. Beckstead; 2nd, John A. Lambertus; 3rd, F. A. James; 4th and 5th, Garland & Gilchrist.

Pullets, 24.—1st, F. A. James; 2nd, Garland & Gilchrist; 3rd, John A. Lambertus; 4th, Frank W. Beckstead; 5th, M. C. Neate.

WHITE PLYMOUTH ROCKS.

Cocks, 4.—1st, F. A. Andrews; 2nd, Geo. E. Craig; 3rd, Geo. Robertson.
Hens, 6.—1st and 2nd, F. A. Andrews; 3rd, Geo. Robertson.
Cockerels, 12.—1st and 2nd, F. A. Andrews; 3rd and 4th, Geo. Robertson.
Pullets, 12.—1st and 3rd, F. A. Andrews; 2nd and 4th, Geo. Robertson.

BUFF PLYMOUTH ROCKS.

Cocks, 5.—1st and 3rd, Garland & Gilchrist; 2nd, D. Cumming.
Hens, 5.—1st, Garland & Gilchrist; 2nd, D. Cumming; 3rd, Ottawa Poultry Yards.
Cockerels, 4.—1st and 2nd, Garland & Gilchrist; 3rd, Ottawa Poultry Yards.
Pullets, 5.—1st and 2nd, Garland & Gilchrist; 3rd, Ottawa Poultry Yards.

GOLDEN WYANDOTTES.

Cocks, 1.—1st, Tooker & Bowey.
Hens, 1.—1st, Tooker & Bowey.
Cockerels, 3.—1st, Rev. J. H. Chant; 2nd, Tooker & Bowey; 3rd, H. Fulford.
Pullets, 3.—1st, Rev. J. H. Chant; 2nd, Tooker & Bowey; 3rd, H. Fulford.

SILVER WYANDOTTES.

Cocks, 5.—1st and 2nd, Garland & Gilchrist; 3rd, William Delary.
Hens, 5.—1st, 2nd and 3rd, Garland & Gilchrist.
Cockerels, 7.—1st, Wm. Delary; 2nd, Garland & Gilchrist; 3rd, Tooker & Bowey.
Pullets, 6.—1st, 2nd, 3rd and 4th, Garland & Gilchrist.

BUFF WYANDOTTES.

Cocks, 5.—1st, C. J. Packham; 2nd, Tooker & Bowey; 3rd, W. H. Carleton.
Hens, 5.—1st, C. J. Packham; 2nd, C. M. Taylor; 3rd, Henry Fulford.
Cockerels, 5.—1st, C. M. Taylor; 2nd, Tooker & Bowey; 3rd, C. J. Packham.
Pullets, 4.—1st, W. H. Carleton; 2nd, C. M. Taylor; 3rd, C. J. Packham.

WHITE WYANDOTTES.

Cocks, 15.—1st, Geo. Higman; 2nd, Wright Bros.; 3rd, G. Lake; 4th, J. McFadden.

Hens, 22.—1st and 5th, Geo. Higman; 2nd, W. Arnold; 3rd, Wright Bros., 4th, Craig & Snetsinger.

Cockerels, 21.—1st, G. Lake; 2nd, Geo. Higman; 3rd, McDougal & Vout; 4th, Craig & Snetsinger; 5th, W. Arnold.

Pullets, 32.—1st and 5th, McDougal & Vout; 2nd, W. Arnold; 3rd, Wright Bros.; 4th, Craig & Snetsinger.

PARTRIDGE WYANDOTTES.

Cocks, 4.—1st, J. E. Fidler; 2nd, Lew Sage; 3rd, L. L. Rodier.
Hens, 5.—1st and 2nd, J. E. Fidler; 3rd, Lew Sage.
Cockerels, 5.—1st and 3rd, J. E. Fidler; 2nd, C. J. Daniels.
Pullets, 6.—1st and 3rd, J. E. Fidler; 2nd, Lew Sage.

A. O. V. WYANDOTTES.

Cocks, 2.—1st, Tooker & Bowey; 2nd, G. & J. Bogue.
Hens, 2.—1st, Tooker & Bowey; 2nd, G. & J. Bogue.
Cockerels, 3.—1st, Tooker & Bowey; 2nd, G. & J. Bogue; 3rd, E. R. Frith.
Pullets, 4.—1st, G. & J. Bogue; 2nd, E. R. Frith; 3rd, Tooker & Bowey.

BLACK JAVAS.

Cocks, 3.—1st, G. & J. Bogue; 2nd, Richard Oke; 3rd, W. H. Reid.
Hens, 5.—1st, Richard Oke; 2nd, G. & J. Bogue; 3rd, Craig & Snetsinger.
Cockerels, 2.—1st, Craig & Snetsinger; 2nd, G. & J. Bogue.
Pullets, 3.—1st, G. & J. Bogue; 2nd, Craig & Snetsinger; 3rd, W. H. Reid.

MOTTLED JAVAS.

Cocks, 2.—1st, Richard Oke; 2nd, W. H. Reid.
Hens, 3.—1st, G & J. Bogue; 2nd, Richard Oke; 3rd, W. H. Reid.
Cockerels, 3.—1st, G & J. Bogue; 2nd, W. H. Reid; 3rd, Richard Oke.
Pullets, 3.—1st, G & J. Bogue; 2nd, Richard Oke; 3rd, W. H. Reid.

RHODE ISLAND REDS.

Cocks, 3.—1st, 2nd and 3rd, Ottawa Poultry Yards.
Hens, 4.—1st, 2nd and 3rd, Ottawa Poultry Yards.
Cockerels, 4.—1st and 2nd, Ottawa Poultry Yards; 3rd, E. R. Frith.
Pullets, 4.—1st and 3rd, Ottawa Poultry Yards; 2nd, E. R. Frith.

B. B. RED GAMES.

Cocks, 3.—1st, S. Stapleford; 2nd, Treadgold & Trebilcock; 3rd, A. G. H. Luxton.
Hens, 4.—1st and 3rd, S. Stapleford; 2nd, Treadgold & Trebilcock.
Cockerels, 4.—1st, S. Stapleford; 2nd, A. G. H. Luxton; 3rd, G. E. Brown.
Pullets, 5.—1st, S. Stapleford; 2nd and 3rd, A. G. H. Luxton.

BROWN RED GAMES.

Cocks, 2.—1st, Treadgold & Trebilcock; 2nd, A. G. H. Luxton.
Hens, 3.—1st, Treadgold & Trebilcock; 2nd, W. H. Reid; 3rd, A. G. H. Luxton.
Cockerels, 3.—1st and 3rd, Treadgold & Trebilcock; 2nd, A. G. H. Luxton.
Pullets, 3.—1st and 2nd, Treadgold & Trebilcock; 3rd, A. G. H. Luxton.

DUCKWING GAMES.

Cocks, 1.—1st, A. G. H. Luxton.
Hens, 1.—1st, Treadgold & Trebilcock.
Cockerels, 2.—1st and 2nd, A. G. H. Luxton.
Pullets, 2.—1st and 2nd, A. G. H. Luxton.

PYLE GAMES.

Cocks, 3.—1st, Treadgold & Trebilcock; 2nd, W. H. Reid; 3rd, A. G. H. Luxton.
Hens, 2.—1st, A. G. H. Luxton; 2nd, W. H. Reid.
Cockerels, 1.—1st, A. G. H. Luxton.
Pullets, 3.—1st and 3rd, Treadgold & Trebilcock; 2nd, A. G. H. Luxton.

C. INDIAN (LACED) GAMES.

Cocks, 3.—1st, Galt E. Brown; 3rd, Dr. J. Pritchard.
Hens, 4.—1st, D. Cumming; 2nd, Dr. J. Pritchard; 3rd, Galt E. Brown
Cockerels, 3.—1st, D. Cumming; 2nd, Dr. J. Pritchard; 3rd, Galt E. Brown.
Pullets, 2.—1st, Dr. J. Pritchard; 2nd, Galt E. Brown.

A. O. S. V., OR W. INDIAN GAMES.

Cocks, 3.—1st, H. R. K. Tozer; 2nd, W. H. Reid; 3rd, C. J. Daniels.
Hens, 3.—1st, C. J. Daniels; 2nd, W. H. Reid; 3rd, H. R. K. Tozer.
Cockerels, 5.—1st, G. & J. Bogue; 2nd, W. H. Reid; 3rd, C. J. Daniels.
Pullets, 5.—1st, C. J. Daniels; 2nd, W. H. Reid; 3rd, G. & J. Bogue.

OLD ENGLISH, OR PIT GAMES.

Cocks, 4.—1st, 2nd and 3rd, E. H. Benjamin.
Hens, 4.—1st, 2nd and 3rd, E. H. Benjamin.
Cockerels, 4.—1st, 2nd and 3rd, E. H. Benjamin.
Pullets, 4.—1st, 2nd and 3rd, E. H. Benjamin.

S. C. WHITE LEGHORNS.

Cocks, 8.—1st, Herbert Byshe; 2nd, Donald McKellar; 3rd, W. H. Carleton.

Hens, 16.—1st, W. H. Carleton; 2nd and 3rd, Plante & Laderoute; 4th, Donald McKellar.

Cockerels, 13.—1st, 3rd and 4th, Donald McKellar; 2nd, W. H. Carleton.

Pullets, 14.—1st, Thos. S. Crouch; 2nd and 3rd, Donald McKellar; 4th, W. H. Carleton.

S. C. BROWN LEGHORNS.

Cocks, 3.—1st, G. H. A. Collins; 2nd, W. J. Player.
Hens, 7.—1st, W. H. Reid; 2nd, W. J. Player.
Cockerels, 4.—1st, W. J. Player; 2nd, G. H. A. Collins; 3rd, D. Cumming.
Pullets, 4.—1st, G. H. A. Collins; 2nd and 3rd, W. J. Player.

S. C. BLACK LEGHORNS.

Cocks, 2.—1st, Henry Fulford; 2nd, W. M. Osborne.
Hens, 3.—1st and 3rd, W. M. Osborne; 2nd, Henry Fulford.
Cockerels, 3.—1st and 2nd, W. M. Osborne;
Pullets, 4.—1st, 2nd and 3rd, W. M. Osborne.

R. C. BROWN LEGHORNS.

Cocks, 2.—1st, Wm. C. Wilson & Sons; 2nd, H. R. K. Tozer.
Hens, 3.—1st, H. R. K. Tozer; 2nd, W. H. Reid; 3rd, Wm. C. Wilson & Sons.
Cockerels, 4.—1st, Wm. C. Wilson & Sons; 2nd. W. H. Reid; 3rd, D. Cumming.
Pullets, 4.—1st, D. Cumming; 2nd, Wm .C. Wilson & Sons; 3rd, W. H. Reid.

A. O. S. V., R. C. LEGHORNS.

Cockerels, 2.—1st, Richard Oke; 2nd. Wm. C. Wilson & Sons.
Pullets, 3.—1st, Plante & Laderoute; 2nd, Richard Oke; 3rd, Wm. C. Wilson & Sons.

SPANISH.

Cocks, 2.—1st, J. H. Warrington; 2nd, G. & J. Bogue.
Hens, 2.—1st, J. H. Warrington; 2nd, G. & J. Bogue.
Cockerels, 2.—1st. J. H. Warrington; 2nd, G. & J. Bogue.
Pullets, 2.—1st, J. H. Warrington; 2nd, G. & J. Bogue.

ANDALUSIANS.

Hens, 1.—1st, E. A. Carswell.

BLACK MINORCAS.

Cocks, 4.—1st, William Ellis; 2nd, Garland & Gilchrist; 3rd, Ottawa Poultry Yards.
Hens, 9.—1st, Garland & Gilchrist; 2nd. William Ellis; 3rd, Ottawa Poultry Yards.
Cockerels, 13.—1st, 3rd and 4th, Garland & Gilchrist; 2nd, G. A. McInnis.
Pullets, 15.--1st, William Ellis; 2nd, E. R. Frith; 3rd and 4th, Garland & Gilchrist.

WHITE MINORCAS.

Cocks, 1.—1st, W. M. Osborne.
Hens, 4.—1st, J. A. Benson; 2nd, W. M. Osborne; 3rd, Garland & Gilchrist.
Cockerels, 3.—1st and 3rd, J. A. Benson; 2nd, W. M. Osborne.
Pullets, 2.—1st, J. A. Benson; 2nd, W. M. Osborne.

BUFF ORPINGTONS.

Cocks, 6.—1st and 3rd, A. W. E. Hellyer; 2nd, J. W. Clark.
Hens, 10.—1st and 3rd, J. W. Clark; 2nd, A. W. E. Hellyer.
Cockerels, 12.—1st and 4th, J. W. Clark; 2nd and 3rd, A. W. E. Hellyer.
Pullets, 14.—1st, 2nd, 3rd and 4th, A. W. E. Hellyer.

WHITE ORPINGTONS.

Cocks, 3.—1st, W. J. Annand; 2nd, R. C. Binning; 3rd, Jas. J. Logan.
Hens, 10.—1st and 2nd, Jas. J. Logan; 3rd, W. J. Annand.
Cockerels, 9.—1st, F C. Bogart; 2nd, R. C. Binning; 3rd, Jas. Stoddart.
Pullets, 11.—1st and 2nd, Jas. J. Logan; 3rd, W. J. Annand.

A. O. V. ORPINGTONS.

Cocks, 4.—1st, C. J. Daniels; 2nd, Murray & Son; 3rd, W. E. Thom.
Hens, 5.—1st, C. J. Daniels; 2nd and 3rd, W. E. Thom.
Cockerels, 10.—1st, W. E. Thom; 2nd, Murray & Son; 3rd, W. H. Snelling.
Pullets, 10.—1st, W. H. Slinn; 2nd, W. H. Snelling; 3rd, Murray & Son.

SILVER GRAY DORKINGS.

Cocks, 1.—1st, A. G. H. Luxton.
Hens, 2.—1st, A. G. H. Luxton; 2nd, J. H. Warrington.

COLORED DORKINGS.

Cocks, 2.—1st, J. H. Warrington; 2nd, W. H. Reid.
Hens, 2.—1st, J. H. Warrington; 2nd. W. H. Reid.
Cockerels, 3.—1st. G. & J. Bogue; 2nd, J. H. Warrington; 3rd, W. H. Reid.
Pullets, 2.—1st. J. H. Warrington; 2nd, G. & J. Bogue.

WHITE DORKINGS.

Cocks, 1.—1st, J. H. Warrington.
Hens, 1.—1st. J. H. Warrington
Cockerels, 1.—1st, J. H. Warrington.
Pullets, 1.—1st, J. H. Warrington.

HOUDANS.

Cocks, 4.—1st, W. H. Reid; 2nd, G. & J. Bogue; 3rd, L. L. Rodier.
Hens, 4.—1st, W. H. Reid; 2nd, L. L. Rodier.
Cockerels, 5.—1st and 2nd, G. & J. Bogue; 3rd, L. L. Rodier.
Pullets, 7.—1st and 2nd, G. & J. Bogue; 3rd, Smith & Brown.

CREVE CŒURS.

Cocks. 3.—1st, G. & J. Bogue; 2nd, J. H. Warrington; 3rd, R. Oke.
Hens, 3.—1st. G. & J. Bogue; 2nd, Richard Oke; 3rd, J. H. Warrington.
Cockerels, 1.—1st, G. & J. Bogue.
Pullets, 2.—1st, G. & J. Bogue; 2nd. Richard Oke.

LA FLECHE.

Cocks, 3.—1st, G. & J. Bogue; 2nd, J. H. Warrington; 3rd, R. Oke.
Hens, 3.—1st. G. & J. Bogue; 2nd. Richard Oke; 3rd, J. H. Warrington.
Cockerels, 3.—1st, G. & J. Bogue; 2nd, Richard Oke; 3rd, J. H. Warrington.
Pullets, 3.—1st, Richard Oke; 2nd, G. & J. Bogue; 3rd. J. H. Warrington.

FAVEROLLES.

Cocks, 2.—1st, Geo. Higman; 2nd. L. L. Rodier.
Hens, 4.—1st, Geo. Higman; 2nd and 3rd, L. L. Rodier.
Cockerels, 3.—1st. W. B. Nantel; 2nd, Plante & Laderoute; 3rd, Geo. Higman.
Pullets, 6.—1st, W. B. Nantel; 2nd, Plante & Laderoute; 3rd, Geo Higman.

BLACK HAMBURGS.

Cocks, 4.—1st and 2nd, Richard Oke; 3rd, W. H. Reid.
Hens, 3.—1st and 2nd, Richard Oke: 3rd. W. H. Reid.
Cockerels, 2.—1st and 2nd. Richard Oke.
Pullets, 3.—1st and 2nd, Richard Oke; 3rd, W. H. Reid.

GOLDEN PENCILLED HAMBURGS.

Cocks, 3.—1st and 3rd, Richard Oke: 2nd. Galt E. Brown.
Hens, 3.—1st and 2nd, Richard Oke; 3rd, Galt E. Brown.
Cockerels, 4.—1st and 3rd. Richard Oke: 2nd. David Stillie.
Pullets, 4.—1st, Richard Oke; 2nd. David Stillie; 3rd, G. E. Brown.

SILVER PENCILLED HAMBURGS.

Cocks, 5.—1st and 2nd, Richard Oke; 3rd, Galt E. Brown.
Hens, 5.—1st and 2nd. Richard Oke: 3rd. W. H. Reid.
Cockerels, 4.—1st and 2nd. Richard Oke; 3rd. Wm. C. Wilsons & Sons.
Pullets, 4.—1st and 2nd, Richard Oke; 3rd, Wm. C. Wilson & Sons.

GOLDEN SPANGLED HAMBURGS.

Cocks, 1.—1st, Richard Oke.
Hens, 3.—1st, Richard Oke: 2nd, G. & J. Bogue: 3rd, Galt E. Brown.
Cockerels, 3.—1st. G. & J. Bogue; 2nd and 3rd, Richard Oke.
Pullets, 3.—1st, G. & J. Bogue; 2nd and 3rd, Richard Oke.

SILVER SPANGLED HAMBURGS.

Cocks, 5.—1st, Richard Oke; 2nd, Galt E. Brown; 3rd, E. A. Carswell.
Hens, 3.—1st, Richard Oke; 2nd, Galt E. Brown; 3rd, E. A. Carswell.
Cockerels, 4.—1st and 2nd, Richard Oke; 3rd, A. Thompson.
Pullets, 5.—1st and 2nd, Richard Oke; 3rd, David Stillie.

RED CAPS.

Cocks, 2.—1st, C. J. Daniels; 2nd, G. & J. Bogue.
Hens, 3.—1st, C. J. Daniels; 2nd, G. & J. Bogue; 3rd, J. H. Warrington.
Cockerels, 2.—1st, G. & J. Bogue; 2nd, C. J. Daniels.
Pullets, 2.—1st, G. & J. Bogue; 2nd, C. J. Daniels.

W. C. B. POLANDS.

Cocks, 1.—1st, Wm. McNeil.
Hens, 2.—1st, Wm. McNeil; 2nd, G. & J. Bogue.
Cockerels, 4.—1st, Wm. McNeil; 2nd and 3rd, W. B. Nantel.
Pullets, 4.—1st, Wm. McNeil; 2nd, W. B. Nantel; 3rd, G. & J. Bogue.

GOLDEN POLANDS.

Cocks, 4.—1st, Wm. McNeil; 2nd, G. & J. Bogue; 3rd, Galt E. Brown.
Hens, 6.—1st and 3rd, Wm. McNeil; 2nd, G. & J. Bogue.
Cockerels, 5.—1st, G. & J. Bogue; 2nd, Galt E. Brown; 3rd, Wm. McNeil
Pullets, 5.—1st, G. & J. Bogue; 2nd and 3rd, Wm. McNeil.

SILVER POLANDS.

Cocks, 2.—1st, G. & J. Bogue; 2nd, W. B. Nantel.
Hens, 5.—1st, Wm. McNeil; 2nd, J. H. Warrington; 3rd, G. & J. Bogue.
Cockerels, 6.—1st and 3rd, G. & J. Bogue; 2nd, W. B. Nantel.
Pullets, 5.—1st, G. & J. Bogue; 2nd, Wm. McNeil; 3rd, W. B. Nantel

WHITE POLANDS.

Cocks, 2.—1st and 2nd, Wm. McNeil.
Hens, 2.—1st and 2nd, Wm. McNeil.
Cockerels, 2.—1st and 2nd, Wm. McNeil.
Pullets, 2.—1st and 2nd, Wm. McNeil.

A. O. S. V. POLANDS.

Cocks, 3.—1st, G &. J. Bogue; 2nd, J. H. Warrington; 3rd, Wm. McNeil.
Hens, 2.—1st, G. & J. Bogue; 2nd, Wm. McNeil.
Cockerels, 2.—1st, G. & J. Bogue; 2nd, Wm. McNeil.
Pullets, 2.—1st, G. & J. Bogue; 2nd, Wm. McNeil.

A. O. S. V. FOWLS.

Cocks, 3.—1st, Richard Oke; 2nd, G. & J. Bogue; 3rd, Bellevue Poultry Yards.
Hens, 4.—1st, Richard Oke; 2nd, G. & J. Bogue; 3rd, J. H. Warrington.
Cockerels, 4.—1st, Wm. McNeil; 2nd, Richard Oke; 3rd, G. & J. Bogue.
Pullets, 4.—1st, Wm. McNeil; 2nd, G. & J. Bogue; 3rd, Richard Oke.

BLACK RED GAME BANTAMS.

Cocks, 1.—1st, Rook Bros.
Hens, 3.—1st and 2nd, Rook Bros.; 3rd, H. R. K. Tozer.
Cockerels, 2.—1st and 2nd, Rook Bros.
Pullets, 5.—1st and 2nd, and 3rd, Rook Bros.

BROWN RED GAME BANTAMS.

Hens, 1.—1st, H. R. K. Tozer.
Pullets, 1.—1st, H. R. K. Tozer.

DUCKWING GAME BANTAMS.

Cocks, 1.—1st, Treadgold & Trebilcock.
Hens, 3.—1st and 2nd, Rook Bros.; 3rd, Treadgold & Trebilcock.
Cockerels, 2.—1st, Treadgold & Trebilcock; 2nd, W. H. Reid.
Pullets, 4.—1st and 2nd, Rook Bros.; 3rd, Treadgold & Trebilcock.

PYLE GAME BANTAMS.

Cocks.—1st, R. E. McKinstry.
Pullets, 2.—1st, Rook Bros.; 2nd, R. E. McKinstry.

A. O. V. GAME BANTAMS.

Cocks, 1.—1st, Rook Bros.
Cockerels, 1.—1st, Doidge & MeNeil.

GOLDEN SEBRIGHT BANTAMS.

Cocks, 3.—1st, Richard Oke; 2nd, W. G. Murray; 3rd, Geo. Hawley.
Hens, 5.—1st and 3rd, Richard Oke; 2nd, W. G. Murray.
Cockerels, 4.—1st, W. G. Murray; 2nd, L. A. Brill; 3rd, Richard Oke.
Pullets, 4.—1st, Richard Oke; 2nd, W. G. Murray; 3rd, L. A. Brill.

SILVER SEBRIGHT BANTAMS.

Cocks, 4.—1st and 2nd, Richard Oke; 3rd, W. G. Murray.
Hens, 6.—1st and 3rd, Richard Oke; 2nd, W. G. Murray.
Cockerels, 6.—1st, Doidge & McNeil; 2nd, Richard Oke; 3rd, W. G. Murray.
Pullets, 5.— 1st. Richard Oke; 2nd, W. J. Slessor; 3rd, L. A. Brill.

ROSE COMB BANTAMS.

Cocks, 4.—1st, Richard Oke; 2nd, W. J. Slessor; 3rd, Doidge & McNeil.
Hens, 4.—1st, Richard Oke; 2nd, W. J. Slessor; 3rd. W. G. Murray.
Cockerels, 6.—1st, W. G. Murray; 2nd, W. J. Slessor; 3rd, Galt E. Brown.
Pullets, 6.—1st, W. G. Murray; 2nd, G. A. McInnis; 3rd, W. J. Slessor.

BUFF COCHIN BANTAMS.

Cockerels, 2.—1st, Doidge & McNeil; 2nd, M. H. McCorkhill.
Pullets, 4.—1st, Doidge & McNeil; 2nd, M. H. McCorkhill; 3rd, E. A. Carswell.

WHITE COCHIN BANTAMS.

Cocks, 2.—1st and 2nd, Doidge & McNeil.
Hens, 3.—1st and 2nd, Doidge & McNeil; 3rd, E. A. Carswell.
Cockerels, 2.—1st and 2nd, Doidge & McNeil.
Pullets, 3.—1st and 2nd, Doidge & McNeil; 3rd, E. A. Carswell.

PARTRIDGE COCHIN BANTAMS.

Cocks, 1.—1st, H. R. K. Tozer.
Hens, 3.—1st and 3rd, Wm. C. Wilson & Sons; 2nd, H. R. K. Tozer.
Cockerels, 1.—1st, Wm. C. Wilson & Sons.
Pullets, 1.—1st, Wm. C. Wilson & Sons.

A. O. V. COCHIN BANTAMS.

Cocks, 3.—1st, W. B. Nantel; 2nd, F. M. Briggs; 3rd, Doidge & McNeil.
Hens, 5.—1st, Doidge & McNeil; 2nd, Wm. C. Wilson & Sons; 3rd, F. M. Briggs.
Cockerels, 6.—1st, L. A. Brill; 2nd and 3rd. F. M. Briggs.
Pullets, 6.—1st, Doidge & McNeil; 2nd, F. M. Briggs; 3rd, W. J. Sleesor.

JAPANESE BANTAMS.

Cocks, 5.—1st and 3rd, Richard Oke; 2nd, W. G. Murray.
Hens, 5.—1st and 3rd, Richard Oke; 2nd, W. G. Murray.
Cockerels, 5.—1st and 3rd, G. A. McInnis; 2nd, Richard Oke.
Pullets, 7.—1st, Richard Oke; 2nd, W. G. Murray; 3rd, G. A. McInnis.

A. O. S. V. BANTAMS.

Cocks, 3.—1st and 2nd, Richard Oke; 3rd, W. G. Murray.
Hens, 3.—1st, W. G. Murray; 2nd and 3rd, Richard Oke.
Cockerels, 3.—1st and 2nd, Richard Oke; 3rd, W. G. Murray.
Pullets, 3.—1st, W. G. Murray; 2nd and 3rd, Richard Oke.

BRONZE TURKEYS.

Cocks, 5.—1st, D. Cumming; 2nd, A. Thompson; 3rd, Geo. R. Bradley.
Hens, 4.—1st, A. Thompson; 2nd, Geo. R. Bradley; 3rd, D. Cumming.
Cockerels, 7.—1st, Craig & Snetsinger; 2nd, Geo. R. Bradley; 3rd, A. Thompson.
Pullets, 8.—1st, Geo. R. Bradley; 2nd and 3rd, Craig & Snetsinger.

WHITE TURKEYS.

Cocks, 1.—1st, D. Cumming.
Hens, 2.—1st, D. Cumming; 2nd, A. Thompson.
Cockerels, 1.—1st, A. Thompson.
Pullets, 2.—1st and 2nd, A. Thompson.

A. O. S. V. TURKEYS.

Cocks, 3.—1st, A. Thompson; 2nd and 3rd, A. G. H. Luxton.
Hens, 4.—1st, A. G. H. Luxton; 2nd and 3rd, A. Thompson.
Cockerels, 2.—1st and 2nd, A. G. H. Luxton.
Pullets. 4.—1st and 2nd, A. G. H. Luxton; 3rd, A. Thompson.

TOULOUSE GEESE.

Ganders, 4.—1st, A. G. H. Luxton; 2nd and 3rd, A. Thompson.
Geese, 3.—1st and 2nd, A. Thompson; 3rd, A. G. H. Luxton.
Ganders, 1906, 3.—1st, A. Thompson; 2nd, W. L. Montgomery.
Geese, 1906, 3.—1st, A. Thompson; 2nd, D. Cumming; 3rd, A. G. H. Luxton.

EMBDEN GEESE.

Ganders, 3.—1st and 2nd, A. Thompson; 3rd, A. G. H. Luxton.
Geese, 3.—1st and 2nd, A. Thompson; 3rd, A. G. H. Luxton.
Ganders, 1906, 2.—1st, A. Thompson; 2nd, W. L. Montgomery.
Geese, 1906, 2.—1st, A. Thompson.

CHINESE GEESE.

Ganders, 3.—1st and 3rd, A. G. H. Luxton; 2nd, A. Thompson.
Geese, 3.—1st, A. Thompson; 2nd and 3rd, A. G. H. Luxton.
Ganders, 1906, 3.—1st, A. Thompson; 2nd and 3rd, A. G. H. Luxton.
Geese, 1906, 3.—1st, A. Thompson; 2nd and 3rd, A. G. H. Luxton.

A. O. V. GEESE.

Ganders, 3.—1st and 3rd, A. Thompson; 2nd, A. G. H. Luxton.
Geese, 3.—1st and 2nd, A. Thompson; 3rd, A. G. H. Luxton.
Ganders, 1906, 2.—1st, A. Thompson; 2nd, A. G. H. Luxton.
Geese, 1906, 3.—1st and 3rd, A. Thompson, 2nd, A. G. H. Luxton.

ROUEN DUCKS.

Drakes, 3 —1st, G. & J. Bogue; 2nd, A. Thompson; 3rd, E. H. Benjamin.
Ducks, 2—1st, G. & J. Bogue; 2nd, A. Thompson.
Drakes, 1906, 1—1st, G. & J. Bogue.
Duck, 1906, 1—1st, G. & J. Bogue.

PEKIN DUCKS.

Drakes, 3—1st, Craig & Snetsinger; 2nd, A. Thompson.
Ducks, 3—1st, A. Thompson; 2nd, Alex. Dynes.
Drakes, 1906, 4—1st, Craig & Snetsinger; 2nd, A. Thompson; 3rd, R. Reid & Co.
Ducks, 1906, 3—1st, A. Thompson; 2nd, Craig & Snetsinger; 3rd, R. Reid & Co.

AYLESBURY DUCKS.

Drake, 1—1st, A. Thompson.
Drakes, 1906, 2—1st and 2nd, A. Thompson.
Ducks, 1906, 2—1st and 2nd, A. Thompson.

CAYUGA DUCKS.

Drakes, 2—1st, G. & J. Bogue; 2nd, A. Tmompson.
Ducks, 2—1st, G. & J. Bogue; 2nd, A. Thompson.
Drakes, 1906, 2—1st, G. & J. Bogue; 2nd, A. Thompson.
Ducks, 1906, 2—1st, G. & J. Bogue; 2nd, A. Thompson.

A. O. V. DUCKS.

Drakes, 1—1st, A. Thompson.
Ducks, 2—1st, A. Thompson; 2nd, A. G. H. Luxton.
Drakes, 1906, 2—1st, A. G. H. Luxton; 2nd, A. Thompson.
Ducks, 1906, 2—1st, A. Thompson; 2nd, A. G. H. Luxton.

SELLING CLASS.

Dorking, Males, 5.—1st, Geo. Robertson; 2nd, J. H. Warrington; 3rd, D. Cumming.

Dorking, Females, 6.—1st, Geo. Robertson; 2nd, D. Cumming; 3rd, J. H. Warrington.

Brahma, Males, 2.—1st, C. C. Cornish.

Brahma, Females, 3.—1st and 3rd, C. C. Cornish; 2nd, W. L. Montgomery.

Plymouth Rock, Males, 56.—1st, F. A. James; 2nd and 3rd, M. C. Neate; 4th and 5th, Geo. Robertson.

Plymouth Rock, Females, 16.—1st, Chesley Pillar; 2nd and 4th, F. A. James; 3rd, John A. Lambertus.

Wyandottes, Males, 8.—1st and 2nd, G. Lake; 3rd, W. L. Montgomery.

Wyandottes, Females, 12.—1st and 2nd, G. Lake; 3rd, W. Delary.

Orpington, Males, 6.—1st, A. W. E. Hellyer; 2nd and 3rd, L. Whitney.

Orpington, Females, 5.—1st, Galt E. Brown; 2nd, Garland & Gilchrist; 3rd, W. H. Slinn.

Minorca, Males, 8.—1st, Ottawa Poultry Yards; 2nd, G. A. McInnis; 3rd, J. A. Benson.

Minorca, Females, 12.—1st, G. A. McInnis; 2nd and 3rd, Ottawa Poultry Yards.

Leghorn, Males, 8.—1st, John T. Gill; 2nd, Donald McKellar; 3rd, J. A. Benson.

Leghorn, Females, 13—1st, Donald McKellar; 2nd, W. L. Montgomery; 3rd, John Grant.

French, Females, 2.—1st, J. H. Warrington.

DRESSED POULTRY.

Pair, Javas, Langshans or Rhode Island Reds.—1st Joseph Tomalin; 2nd and 3rd, Ottawa Poultry Yards.

Pair, Plymouth Rocks.—1st, A. A. Armstrong; 2nd, W. H. Slinn; 3rd, G. E. Craig; 4th, Joseph Tomalin.

Pair, Wyandottes.—1st and 2nd, Geo. R. Bradley; 3rd, Joseph Tomalin.

Pair, Minorcas, Andalusians or Leghorns.—1st and 2nd, Thos. S. Crouch; 3rd, Joseph Tomalin.

Pair, Orpingtons.—1st, 2nd and 3rd, W. H. Slinn.

Pair, Game.—1st, Joseph Tomalin.

Best pair.—1st, A. A. Armstrong.

Turkey, Male, any age.—1st, Joseph Tomalin.

Turkey, Female, any age.—1st, Joseph Tomalin.

Turkey, Male, 1906.—1st, Geo. R. Bradley; 2nd and 3rd, Joseph Tomalin; 4th, R. Reid & Co.

Turkey, Female, 1906.—1st, Geo. R. Bradley; 2nd and 3rd, Joseph Tomalin.

White Goose.—1st and 2nd, Geo. R. Bradley.

Colored Goose.—1st and 2nd, D. Cumming; 3rd, Joseph Tomalin.

Pair, White Ducks.—2nd, Joseph Tomalin.

Pair, Colored Ducks.—1st, A. Thompson; 2nd, Joseph Tomalin.

Dozen Eggs, White.—1st, Joseph Tomalin.

Dozen Eggs, Colored.—1st, Joseph Tomalin; 2nd, R. Fallis; 3rd, G. Lake.

Pair, Squabs.—1st and 2nd, Joseph Tomalin.

PIGEONS.

BLACK CARRIER.

Cocks, 1.—1st, W. H. Reid. *Hens, 2.*—1st and 2nd, W. H. Reid.

A. O. S. C. CARRIER.

Cocks, 1.—1st, W. H. Reid. *Hens, 1.*—1st, W. H. Reid.

WHITE POUTER.

Cocks, 1.—2nd, W. H. Reid. *Hens, 1.*—2nd, W. H. Reid.

PIGMY POUTER.

Cocks, 2.—1st and 2nd, W. H. Reid. *Hens, 2.*—1st and 2nd, W. H. Reid.

L. F. MUFFLED TUMBLER.

Cocks, 4.—1st and 3rd, Capital Pigeon Lofts; 2nd, W. H. Reid.
Hens, 3.—1st and 2nd, Capital Pigeon Lofts; 3rd, W. H. Reid.

L. F. CLEAN LEG TUMBLER.

Cocks, 4.—1st, A. & T. Readwin; 2nd, W. H. Reid; 3rd, Capital Pigeon Lofts.
Hens, 4.—1st, W. H. Reid; 2nd, A. & T. Readwin; 3rd, Capital Pigeon Lofts.

S. F. TUMBLER.

Cocks, 2.—1st and 2nd, W. H. Reid. *Hens, 1.*—1st, W. H. Reid.

BARB, ANY COLOR.

Cocks, 4.—1st and 2nd, A. & T. Readwin; 3rd, Capital Pigeon Lofts.
Hens, 4.—1st and 2nd, A. & T. Readwin; 3rd, Capital Pigeon Lofts.

WHITE TRUMPETER.

Cocks, 1.—1st, W. H. Reid. *Hens, 1.*—1st, Capital Pigeon Lofts

A. O. S. C. TRUMPETER.

Cocks, 3.—1st, W. H. Reid; 2nd and 3rd, Capital Pigeon Lofts.
Hens, 1.—1st, W. H. Reid.

RED OR YELLOW JACOBIN.

Cocks, 3.—1st and 2nd, W. H. Reid; 3rd, Capital Pigeon Lofts.
Hens, 2.—1st, Capital Pigeon Lofts; 2nd, W. H. Reid.

WHITE JACOBIN.

Cocks, 1.—2nd. W. H. Reid.

A. O. S. C. JACOBIN.

Cocks, 2.—1st and 2nd, W. H. Reid
Hens, 3.—1st, W. H. Reid; 2nd and 3rd, Capital Pigeon Lofts.

ORIENTAL FRILLS.

Cocks, 3.—1st and 3rd, Capital Pigeon Lofts; 2nd, W. H. Reid.
Hens, 3.—1st and 3rd, Capital Pigeon Lofts; 2nd, W. H. Reid.

R. C. ANTWERP.

Cocks, 2.—1st and 2nd, W. H. Reid. *Hens, 1.*—1st, W. H. Reid.

SILVER DUN ANTWERP.

Cocks, 1.—1st.—W. H. Reid. *Hens, 1.*—1st, W. H. Reid.

WHITE FANTAIL.

Cocks, 3.—1st and 2nd, Capital Pigeon Lofts; 3rd, W. H. Reid.
Hens, 3.—1st and 2nd, Capital Pigeon Lofts; 3rd, W. H. Reid.

BLUE FANTAIL.

Cocks, 3.—1st, W. H. Reid; 2nd, A. & T. Readwin; 3rd, Capital Pigeon Lofts.
Hens, 3.—1st, Capital Pigeon Lofts; 2nd, W. H. Reid; 3rd, A. & T. Readwin.

A. O. S. C. FANTAIL.

Cocks, 4.—1st and 3rd, Capital Pigeon Lofts; 2nd, W. H. Reid.
Hens, 3.—1st and 2nd, Capital Pigeon Lofts.

BLACK, RED OR YELLOW MAGPIE.

Cocks, 3.—1st and 3rd, R. E. McKinstry; 2nd, A. & T. Readwin.
Hens, 5.—1st, 2nd and 3rd, R. E. McKinstry.

A. O. C. MAGPIE.

Cocks, 3.—1st and 2nd, R. E. McKinstry.
Hens, 4.—1st and 3rd, R. E. McKinstry; 2nd, A. & T. Readwin.

BLUE FLYING HOMER.

Cocks, 2.—1st, Capital Pigeon Lofts. *Hens, 2.*—1st, Capital Pigeon Lofts.

A. O. C., FLYING HOMER.

Cocks, 4.—1st, A. & T. Readwin; 2nd, John I. Gill; 3rd, Capital Pigeon Lofts.
Hens, 3.—1st, John I. Gill; 2nd and 3rd, Capital Pigeon Lofts.

BLACK SWALLOW.

Cocks, 2.—1st and 2nd, W. H. Reid.
Hens, 4.—1st, A. & T. Readwin; 2nd and 3rd, W. H. Reid.

A. O. S. C., SWALLOW.

Cocks, 3.—1st and 2nd, W. H. Reid. *Hens, 2.*—1st and 2nd, W. H. Reid.

A. O. C., SWALLOW.

Cocks, 4.—1st and 3rd, W. H. Reid; 2nd, Plante & Laderoute.
Hens, 3.—1st, Plante & Laderoute; 2nd and 3rd, W. H. Reid.

DRAGOON.

Cocks, 1.—1st, W. H. Reid. *Hens, 1.*—1st, W. H. Reid.

ARCHANGEL.

Cocks, 5.—1st, Capital Pigeon Lofts; 2nd, W. H. Reid; 3rd, A. & T. Readwin.
Hens, 5.—1st and 3rd, A. & T. Readwin; 2nd, W. H. Reid.

NUNS.

Cocks, 4.—1st, A. & T. Readwin; 2nd and 3rd, Plante & Laderoute.
Hens, 3.—1st, Plante & Laderoute; 2nd, A. & T. Readwin.

A. C. AFRICAN OWLS.

Cocks, 5.—1st, Plante & Laderoute; 2nd, W. H. Reid; 3rd, Capital Pigeon Lofts.
Hens, 5.—1st and 3rd, Plante & Laderoute; 2nd, W. H. Reid.

OWLS, ENGLISH, ANY VARIETY.

Cocks, 2.—1st, W. H. Reid; 2nd, Capital Pigeon Lofts.
Hens, 1.—2nd, Capital Pigeon Lofts.

A. O. V. OWLS.

Hens, 1.—1st, Plante & Lederoute.

BLACK TURBIT.

Cocks, 1.—1st, W. H. Reid. *Hens, 1.*—1st, W. H. Reid.

BLUE TURBIT.

Cocks, 1.—1st, W. H. Reid.
Hens, 2.—1st, W. H. Reid; 2nd, A. & T. Readwin.

A. O. C. TURBIT.

Cocks, 2.—1st, W. H. Reid; 2nd, A. & T. Readwin.
Hens, 1.—1st, A. & T. Readwin.

A. O. S. V. PIGEONS.

Cocks, 11.—1st, A. & T. Readwin; 2nd, Capital Pigeon Lofts; 3rd, R. E. McKinstry.
Hens, 12.—1st, A. & T. Readwin; 2nd and 3rd, R. E. McKinstry.

BELGIAN HARES, UNDER 6 MONTHS.

Bucks, 1.—1st, Thos. S. Crouch. *Does, 1.*—1st, Thos. S. Crouch.

POULTRY SPECIALS.

Light Brahmas.—Best male, W. B. Nantel; best female, J. Belford; best cock, hen, cockerel and pullet, W. B. Nantel; best collection, W. B. Nantel.

Dark Brahmas—Best collection, Lew Sage; best shaped female, J. Belford.

Brahmas.—Best shaped female, J. Belford.

Partridge Cochins.—Best male, Richard Oke; best female, Richard Oke.

Cochins.—Best pair, Richard Oke.

Langshans.—Best male, R. McCurdy; best female, R. McCurdy.

Barred Plymouth Rocks—Best male, M. C. Neate; best female, F. A. James; best cock, hen, cockerel and pullet, F. W. Beckstead; best pullet, F. A. James.

White Plymouth Rocks.—Best male, F. A. Andrews; best female, F. A. Andrews.

Plymouth Rocks, except Barred.—Best cock, hen, cockerel and pullet, Garland & Gilchrist.

Golden Wyandottes.—Best male, Tooker & Bowey; best female, Tooker & Bowey.

Silver Wyandottes.—Best male, William Delarey; best female, Garland & Gilchrist.

White Wyandottes.—Best male, Geo. Higman; best female, Geo. Higman; best cock, hen, cockerel and pullet, Geo. Higman; best cock, Wright Bros.; best hen, W Arnold; best cockerel, G. Lake; best pullet, McDougal & Vout; best cockerel and pullet, McDougal & Vout.

Partridge Wyandottes.—Best male, J. E. Fidler; best female, J. E. Fidler.

Buff Wyandottes.—Best cock, Tooker & Bowey; best collection, W. H. Carleton.

Wyandottes, except White.—Best cock, hen, cockerel and pullet, J. E. Fidler.

Columbian Wyandottes.—Best male, Tooker & Bowey.

Javas.—Best male, Craig & Snetsinger; best female, Richard Oke.

Rhode Island Reds.—Best male or female, Ottawa Poultry Yards.

Black Red Games.—Best male, S. Stapleford; best female, S. Stapleford.

Pyle Games.—Best male, Treadgold & Trebilcock; best female, Treadgold & Trebilcock.

Indian Games.—Best pair, Galt E. Brown.

White Leghorns.—Best male, Donald McKellar; best female, W. H. Carleton; best cock, hen, cockerel and pullet, D. McKellar.

R. C. Brown Leghorns.—Best collection, Wm. C. Wilson & Sons.

Brown Leghorns.—Best male, Wm. C. Wilson & Sons.

Leghorns, except White.—Best cock, hen, cockerel and pullet, W. M. Osborne.

Spanish.—Best male, J. H. Warrington; best female, J. H. Warrington.

S. C. Black Minorcas.—Best collection, Garland & Gilchrist.

Minorcas.—Best male, William Ellis; best female, Garland & Gilchrist; best cock, hen, cockerel and pullet, Garland & Gilchrist.

Buff Orpingtons.—Best male, J. W. Clark; best female, J. W. Clark; best cock, hen, cockerel and pullet, A. W. E. Hellyer.

White Orpingtons.—Best male, R. C. Binning; best female, Jas. J. Logan.

Orpingtons, except Buff.—Best cock, hen, cockerel and pullet, Jas. J. Logan.

Silver Grey Dorkings.—Best male, A. G. H. Luxton; best female, A. G. H. Luxton.

Colored Dorkings.—Best male or female, J. H. Warrington.

Dorkings.—Best pair, J. H. Warrington.

Houdans.—Best male, G. & J. Bogue; best female, G. & J. Bogue.

Creve Coeurs.—Best male, G. & J. Bogue; best female, G. & J. Bogue.

La Fleche.—Best male, G. & J. Bogue; best female, G. & J. Bogue.

Faverolles.—Best pair, W. B. Nantel.

French.—Best collection in any one variety, G. & J. Bogue.

Black Hamburgs.—Best male or female, Richard Oke.

G. P. Hamburgs.—Best male or female, Richard Oke.

S. P. Hamburgs.—Best male or female, Richard Oke.

G. S. Hamburgs.—Best male or female, G. & J. Bogue.

S. S. Hamburgs.—Best male or female, Richard Oke.

Red Caps.—Best male or female, G. & J. Bogue.

W. C. B. Polands.—Best male or female, Wm. McNeil.

Golden Polands.—Best male or female, Wm. McNeil.

Silver Polands.—Best male or female, Wm. McNeil.

White Polands.—Best male or female, Wm. McNeil.

Golden Bearded Polands.—Best male or female, G. & J. Bogue.

Silver Bearded Polands.—Best male or female, G. & J. Bogue.

White Bearded Polands.—Best male or female, Wm. McNeil.

Buff Laced Polands.—Best male or female, G. & J. Bogue.

Polands.—Best pair, Wm. McNeil.

Sultans.—Best male or female, Richard Oke.

Silkies.—Best male or female, Wm. McNeil.

Bantams.—Best Bantam in Show, R. E. McKinstry.

Turkeys.—Best pair, A. Thompson.

Geese.—Best pair, A. Thompson.

Ducks.—Best pair, G. & J. Bogue.

Best Bird in Show (Pigeons, Bantams, Turkeys, Geese and Ducks not competing).—J. W. Clark; best two cocks, two hens, three cockerels and three pullets, Garland & Gilchrist; largest and best exhibit of any one variety of poultry excepting Bantams, Garland & Gilchrist; largest and best exhibit of any one variety of Bantams, Rook Bros.; best male chick of 1906, J. W. Clark; best four pigeons of any one variety, R. E. McKinstry; best collection of Pigeons, W. H. Reid; best Pigeon in Show, R. E. McKinstry.

The Ottawa Poultry Association donated prizes as follows, open to all members in good standing January 1st, 1907:—

Light Brahmas.—Best hen, J. Belford.

Asiatics.—Best male, Dr. J. Pritchard; best female, J. Belford; best bird, J. Belford.

Barred Plymouth Rocks.—Best male, M. C. Neate; best female, F. A. James; member winning least number of prizes in Barred Plymouth Rock Class, M. C. Neate.

Plymouth Rocks, except Barred.—Best male or female, Garland & Gilchrist.

White Wyandottes.—Best male, Geo. Higman; best female, Geo. Higman.

Wyandottes, except White.—Best male or female, Garland & Gilchrist.

White Leghorns.—Best male, Donald McKellar; best female, W. H. Carleton.

Leghorns, except White and Minorcas.—Best male or female, G. H. A. Collins.

Buff Orpingtons.—Best male, A. W. E. Hellyer; best female, A. W. E. Hellyer; member winning the least number of prizes in Buff Orpington Class, A. W. E. Hellyer.

White Orpingtons.—Member winning the least number of prizes in White Orpington Class, Jas. Stoddart.

Orpingtons, except White.—Best male or female, W. H. Slinn.

Faverolles.—Best male or female, Geo. Higman; best cock, hen, cockerel and pullet (all breeds except Bantams), J. H. Warrington.

MEMBERS OF THE DOMINION CATTLE BREEDERS' ASSOCIATION, 1906 AND 1907.

Name and Address.	Breed.
Abbott, Fred., Harrietsville	Holstein-Friesian.
Alton, H. E., Everton	Shorthorn.
Amos, Geo., & Son, Moffatt	Shorthorn.
Acres, J. G., Vernon	Holstein-Friesian.
Armstrong, M., Tillsonburg	Holstein-Friesian.
Arnold, J. B., Easton's Corners	Holstein-Friesian.
Anderson, Thos., Lyn	Holstein-Friesian.
Armstrong, Wm., Locust Hill	Holstein-Friesian.
Agricultural School, L'Assomption, Que.	Ayrshire.
Agricultural School, Ste. Anne de la Pocatiere, Que.	Ayrshire.
Aikenhead, John, Hartney, Man.	Ayrshire.
Anderson, Robt., North Georgetown, Que.	Ayrshire.
Archibald, C. A., Truro, N.S.	Ayrshire.
Armstrong, Jas., Shawville, Que.	Ayrshire.
Aylwin, Chas. S., Freeman	Ayrshire.
Armstrong, Major A. K., Danville, Que.	Ayrshire.
Archambault, Odillion, St. Paul l'Ermite, Que.	Ayrshire.
Anderson, Geo. W., Mountain View	Holstein-Friesian.
Albright, Nelson, St. Andrews, Que.	Ayrshire.
Anderson, Wm., Lyn	Holstein-Friesian.
Alexander, Jos., Miscouche Rapids, Que.	Ayrshire.
Anderson, I. W., Winnipeg, Man.	Galloway.
Ares, Austin, St. Michael de Rougement, Que.	Ayrshire.
Barnett, Jas. W., Brooklin.	Shorthorn.
Baker, Edward, Winchester	Shorthorn.
Baker, Edwin, Winchester	Holstein-Friesian.
Barr, John, Blyth	Shorthorn.
Brown, D. H., Beith, Que.	Holstein-Friesian.
Boyes, Wm. J., Brooklin	Shorthorn.
Brown, Jas., Norval	Shorthorn.
Brown, J., & Son, Galt	Shorthorn.
Baird, Charles, Motherwell	Holstein-Friesian.
Baldwin, Geo. A., Dunnville, Ont.	Holstein-Friesian.
Barnett, Robert, Curries	Holstein-Friesian.
Beck, S. R., South Cayuga	Holstein-Friesian.
Bell, Wm. T., Willetsholme	Holstein-Friesian.
Brown, W. W., Lyn	Holstein-Friesian.
Belanger, Maxime, St. Eustache, Que.	Ayrshire.
Bryant, W. A., Cairngorm	Holstein-Friesian.
Brown, F. L., Beith, Que.	Holstein-Friesian.
Bullard, B., Plum Hollow	Holstein-Friesian.
Bailey, W. J., Nober	Holstein-Friesian.
Barber, Frank, Villa Nova	Holstein-Friesian.
Beale, T. R., Athens	Holstein-Friesian.
Bellamy, Geo. C., Toledo, Ont.	Holstein-Friesian.
Bedggood, Thos. E., Crumlin	Holstein-Friesian.
Blayney, J. E., Lynnville, Ont.	Holstein-Friesian.
Bollert, H., Cassel	Holstein-Friesian.
Brown, John, Oxford Centre	Holstein-Friesian.
Buchanan, John, Elia	Holstein-Friesian.
Brown, John C., Stamford	Holstein-Friesian.
Burt, D., St. George	Holstein-Friesian.
Burr, Peter, Bloomfield	Holstein-Friesian.
Bowman, Jas., Guelph	Aberdeen-Angus.
Broadfoot, T. B., Fergus	Aberdeen-Angus.
Buckrell, John, Beaconsfield	Holstein-Friesian.
Binnie, Jas., Erin	Aberdeen-Angus.
Burt, J. W., Coningsby	Aberdeen-Angus.
Bell, J. J., Waverly	Aberdeen-Angus.
Ballantyne, W. W., Stratford	Ayrshire.
Baxter, David, North Georgetown, Que.	Ayrshire.
Begg, Victor, Moose Creek	Ayrshire.
Bell & Sons, J., Farnham Centre, Que.	Ayrshire.
Bell, M.D., Jas., Dorchester St., Montreal, Que.	Ayrshire.
Black, Fred. S., Amherst, N.S.	Ayrshire.
Blue, John, Capelton, Que.	Ayrshire.
Biglow, Samuel, Canning, N.S.	Ayrshire.
Brown, Alf., Hemmingford, Que.	Ayrshire.
Bryson, James, Brysonville, Que.	Ayrshire.
Bullock, W. J., Lakefield	Ayrshire.
Burbank, A., Niagara-on-the-Lake	Ayrshire.
Begg, Jas., Box 1083, St. Thomas	Ayrshire.
Baxter, E., North Georgetown, Que.	Ayrshire.
Bell, A. E., Farnham Centre, Que.	Ayrshire.
Blackney, F. R., South Qu'Appelle, Sask.	Ayrshire.
Blue, John, Eustis, Que.	Ayrshire.

Benne-Enfant, Joseph, St. Paul l'Ermite, Que.	Ayrshire.
Brown, John, Howick Station, Que.	Ayrshire.
Boyd, Geo., Spring Valley	Holstein-Friesian.
Ballou, G. W., New York City, U.S.A., 402 Produce Exchange	Ayrshire.
Bogart, J. W., Morewood	Ayrshire.
Benning, Jas., Williamstown	Ayrshire.
Beaudin, P. A., Montreal, Que.	Ayrshire.
Black, D. Allan, Kingston	Ayrshire.
Bustard, George, Vicars, Que.	Ayrshire.
Berger, Fred., St. Theodosia de Acton, Que.	Ayrshire.
Binette, J. F., St. Anne de Prescott	Ayrshire.
Broughton, Geo. A., Harriston	Hereford.
Bennett, L. L., Bennett, Que.	Hereford.
Boyd, Mossom, Bogcaygeon	Hereford.
Bedard, Jas., Richmond, Que.	Hereford.
Bennett, W., Chatham	Hereford.
Black, W. W., Amherst, N.S.	Hereford.
Bing & Wilson, Glenella, Man.	Hereford.
Barnes, Fred., Birr, Ont.	Hereford.
Brote, Harold V., LaRiviere, Man.	Hereford.
Boyd, N., Carberry, Man.	Galloway.
Clark, R., City View	Ayrshire.
Currie, L. D., Ospringe	Shorthorn.
Cameron, J. W., Perth	Holstein-Friesian.
Campsall, Benj., Hartington	Holstein-Friesian.
Campbell, Robert, Roseneath	Holstein-Friesian.
Carlisle, G. T., Newton Brook	Holstein-Friesian.
Carr, Fred., St. Thomas	Holstein-Friesian.
Caskey, J. A., Madoc	Holstein-Friesian.
Clemons, G. W., St. George	Holstein-Friesian.
Cline, J. M., Mapleton	Holstein-Friesian.
Connor, Holland, Gananoque Jct.	Holstein-Friesian.
Curtis, Alfred, Willetsholme	Holstein-Friesian.
Campbell, Dan., Vernon	Holstein-Friesian.
Carlaw, T. B., Warkworth	Holstein-Friesian.
Caughell, G. H., Aylmer	Holstein-Friesian.
Charlton, N. G., Brownsville	Holstein-Friesian.
Clarkson, John, Summerville	Holstein-Friesian.
Cook, B. G., Ingersoll	Holstein-Friesian.
Cohoe, J. W., New Durham	Holstein-Friesian.
Coon, S. A., Athens	Holstein-Friesian.
Countryman, G W., Tweed	Holstein-Friesian.
Curtis, W. J., Willetsholme	Holstein-Friesian.
Coke, J., Erin	Aberdeen-Angus.
Cotee, Edward, Ste. Elizabeth, Que.	Ayrshire.
Caldwell, J. H., Fallowfield	Holstein-Friesian.
Clare, Herbert, Norwich	Holstein-Friesian.
Chambers, E. C., Fairfield Plain	Holstein-Friesian.
Champion, W. M., Reaburn, Man.	Ayrshire.
Cumming, A. J., Heckston	Ayrshire.
Campbell, John R., & Son, Vernon	Ayrshire.
Carlyle Bros., Morewood	Ayrshire.
Creighton, J. C., Hawley	Ayrshire.
Clark, Jas., Campbellford	Ayrshire.
Cavers, Jas. P., Ormstown, Que.	Ayrshire.
Callendar, Jas., North Gower	Ayrshire.
Central Experimental Farm, Ottawa	Ayrshire.
Clark, J. G., Ottawa	Ayrshire.
Clark, Alex., Brinstones Corners	Ayrshire.
Cleland, Arch., Hemingford, Que.	Ayrshire.
Cleugh, Wm., Campbellford	Ayrshire.
Cottingham, Jas., Ormstown, Que.	Ayrshire.
Crockett, T., Danville, Que.	Ayrshire.
Cumming, D., Russell	Ayrshire.
Cumming, Donald, Lancaster	Ayrshire.
Clark, Wm., Meyersburg	Ayrshire.
Cain, Fred. L., 23 St. Helen St., Montreal, Que.	Ayrshire.
Charpentier, Philias, Le Epiphanie, Que.	Ayrshire.
Cloutier, Jos., River Au Chene, Que.	Ayrshire.
Clute, Justice, Toronto	Ayrshire.
Couture, Francis, St. Augustine, Que.	Ayrshire.
Cloutier, Alph. P., St. Prosper, Que.	Ayrshire.
Cohoon, Emerson, Harrietsville	Ayrshire.
Couter, Edward, St. Elizabeth, Que.	Ayrshire.
Cameron, Gus., Scotch Hill, N.B.	Ayrshire.
Comotois, Jos., St. Jean de Matha, Que.	Ayrshire.
Clifford, L. O., Oshawa	Hereford.
Chapman, J. A., Beresford, Man.	Hereford.
Campbell, R. A., Canyon, Texas, U.S.A.	Hereford.
Canadian Land & Ranch Co., Crane Lake, Sask.	Hereford, Galloway.
Colbeck, Thos. M., Grand Valley	Hereford.
Crawford, J. M., Innisfail, Alta.	Hereford.
Cameron, J. A., Oak Lake, Man.	Hereford.
Cumberland, Barlow, Port Hope	Ayrshire.

MEMBERS OF THE DOMINION CATTLE BREEDERS' ASSOCIATION, 1906 AND 1907.—*Continued.*

Name and Address.	Breed.
Campbell, John, Dalmeny	Ayrshire.
Cole & Son, R., Wooler	Ayrshire.
Campbell, R. A., Canyon, Texas, U.S.A.	Hereford.
Captain, John, Jumping Pond, Alta.	Hereford.
Copland, F. M., Harriston	Hereford.
Capithorn, J., Jumping Pond, Alta.	Hereford.
Campkin & Lee, Indian Head, Sask.	Hereford.
Crandell, B., M.D., Crandell, Man.	Hereford.
Currie, John, Newmarket	Hereford.
Cowan, Wellwood. Rokeby, Sask.	Galloway.
Dunkin, T. L., Norwich	Holstein-Friesian.
Davidson, Thos., Spring Valley	Holstein-Friesian.
Davidson, J. G., Armitage	Aberdeen-Angus.
Dick, A. P., Ashgrove	Aberdeen-Angus.
Dennis, Edgar, Newmarket	Holstein-Friesian.
Davis, Geo., Alton	Aberdeen-Angus.
Davidson, E. G., Ayers Flats, Que.	Ayrshire.
Douglass, John H., Warkworth	Ayrshire.
Deeks, J. H., Dunbar	Ayrshire.
Dunfield Bros., Dauphin, Man.	Ayrshire.
Denyes, H. K., Foxboro	Ayrshire.
Descoteaux, J. F., St. Monique, Que.	Ayrshire.
Davies, Robert, Toronto	Ayrshire.
Dawes & Co., Lachine	Ayrshire.
Denis, Arsene, St. Norbert, Que	Ayrshire.
Dingwell, Jas., Williamstown	Ayrshire.
Drummond, A. McD., Petite Cote, Que	Ayrshire.
Drysdale, Thos., Allans Corners, Que.	Ayrshire.
Dundon, John, Hedley Lodge, St. Roch's, Que.	Ayrshire.
Deschamp, Louis, St. Paul l'Ermite, Que	Ayrshire.
Dyment, N., Clappison's Corners	Ayrshire.
Dixon, Mrs. Homer, Niagara Falls, N.Y.	Ayrshire.
Doig, John, Lachute, Que.	Ayrshire.
Donaldson, James, Dewittville, Que.	Ayrshire.
Downey, Jas., Fordwich	Hereford.
Donovan, J. M., Coldbrook, N.B.	Ayrshire.
Dunn, Andrew, Ingersoll	Holstein-Friesian.
Department of Agriculture, Edmonton, Alta.	Hereford.

Name and Address.	Breed.
Deschamps, Philias, St. Paul l'Ermite, Que.	Ayrshire.
Drew, L. G., Oshawa	Hereford.
Daniel, Drummond, Ottawa	Ayrshire.
Elliott, John, Marden	Shorthorn.
Elliott, W. R., & Son, Guelph	Shorthorn
Edwards, John, Algonquin	Holstein-Friesian.
Ede, P. D., Oxford Centre	Holstein-Friesian.
Ellis, Wm. G., Bedford Park	Holstein-Friesian.
Eldridge, John, Hepworth Station	Aberdeen-Angus.
Easton Bros., Charlottetown, P.E.I.	Ayrshire.
Edwards & Co., Rockland	Ayrshire.
Empey, Adam, Springfield	Ayrshire.
Eadie, J. W., Vars	Ayrshire.
Eadie, A. G., Vars	Ayrshire.
Eadie, John R., Russell	Ayrshire.
Elliott, Jas., Tatehurst, Que.	Ayrshire.
Eyre, H. E., Chantry	Ayrshire.
Elliott, Thos., Regina, Sask.	Hereford.
Edwards & Co., W. C., Rockland	Hereford.
Elliott & Sons, Wm., Porter's Hill	Hereford.
Ellis, Mrs. Caroline, Innisfail, Alta	Hereford.
Eaton, J. A., Winnipeg, Man.	Hereford.
Evans, E., & Sons, South Cayuga	Galloway.
Ellams, D., Saskatchewan Landing, Sask.	Galloway.
Fairbairn, H. K., Thedford	Shorthorn.
Foster, A. H., Twin Elm	Shorthorn.
Fargey, Peter, Belleville	Holstein-Friesian.
Fletcher, Jos., Oxford Mills	Holstein-Friesian.
Fry, C. C., Bright	Holstein-Friesian.
Fierheller, E. E., Mt. Elgin	Holstein-Friesian.
Fierheller, C. D., Mt. Elgin	Holstein-Friesian.
Foster, A. D., Bloomfield	Holstein-Friesian.
Flatt, C. D., Millgrove	Holstein-Friesian.
Farlinger, W. K., Morrisburg	Ayrshire.
Fisher, Hon. Sydney, Knowlton, Que.	Ayrshire.
Fox, M. C., Cobourg	Ayrshire.
Fisher, Geo. E., Chatham, N.B.	Ayrshire.
Fyles, F. F., Abercorn, Que	Ayrshire.
Foster, E. P., Dundela	Ayrshire.

Ferguson, John, Camlachie	Ayrshire.
Forget, Rev. J. A., Embrun	Ayrshire.
Fairburn, T., Billings Bridge	Ayrshire.
Ferguson, John A., Marshfield, P.E.I.	Ayrshire.
Ferland, Jos. B., Sorel, Que.	Holstein-Friesian.
Fenton Bros., Solsgirt, Man.	Hereford.
Fleming, Henry, Craigleith	Hereford.
Foxall, B. J., Ewing, Alta.	Hereford.
Found, John, Oshawa	Hereford.
Fletcher, Art., Mound, Alta.	Hereford.
Freese, H., Arden, Man.	Galloway.
Fulton, Geo., Fulton's Mills	Ayrshire.
Gardhouse, John, & Son, Highfield	Shorthorn.
Gerrie, Wm. G., Belwood	Shorthorn.
Groff, I. & A., Alma	Shorthorn.
Gosnell, Ernest, Highgate	Shorthorn.
Govenlock, Jno. A., Forest	Hereford.
George, H. E., Crampton	Holstein-Friesian.
Gilroy, C. J., Glen Buell	Holstein-Friesian.
Gleason, Reuben, Medina	Holstein-Friesian.
Glazier, D. N., Brockville	Holstein-Friesian.
Grey, A. N., Eden	Holstein-Friesian.
George, E. D., Putnam	Holstein-Friesian.
Grosjean, J. L., Brookside	Holstein-Friesian.
Gies, C. R., Heidelberg	Holstein-Friesian.
Gilroy, G. A., Glen Buell	Holstein-Friesian.
Gilbraith, R., Shelburne	Aberdeen-Angus.
Gilmour, Jno. J., Campbellcroft	Aberdeen-Angus.
Gaw, Jas., Sheffordvale, Que.	Ayrshire.
Gilroy, Joshua, Lyn	Ayrshire.
Gordon, Hector, Howick, Que.	Ayrshire.
Gibbons, W. T., Northcote	Ayrshire.
Goodliffe, S. J., Sussex, N.B.	Ayrshire.
Greenshields, J. N., Danville, Que.	Ayrshire.
Greenway, Hon. Thos., Crystal City, Man.	Ayrshire.
Greig, Wm., Allans Corners, Que.	Ayrshire.
Gouin, P. A., Three Rivers, Que.	Ayrshire.
Girouord, Adolphe, St. Barnabe, Que.	Ayrshire.
Girouard, Eli, St. Victoire, Que.	Ayrshire.
Greer, Wm., Ormstown, Que.	Ayrshire.
Gustin, S. A., Fitch Bay, Que.	Ayrshire.
Gillies, Wm., Robb	Hereford.
Gallaugher, Hugh, Rosemont	Hereford.
Gooderham, D. J., Thornhill	Holstein-Friesian.
Gregg, F. H., Salford	Holstein-Friesian.
Griffin, F. J., Burgessville	Holstein-Friesian.
Gilbert, H. J., Dereham Centre	Holstein-Friesian.
Garth, Thos., Griswold, Man.	Hereford.
Guy, S. W., Griersville	Hereford.
Goodchilds, A., Craighleith	Hereford.
Goggin, J. J., Carberry, Man.	Hereford.
Gilman, H., Griswold, Man.	Hereford.
Graham, Jas., Roden, Man.	Hereford.
Harding, R. H., Thorndale	Shorthorn.
Harvey, Robert, Guelph	Grades.
Henderson, G. & J. P., Guelph	Shorthorn.
Hood, G. B., Guelph	Grades.
Holmwood, Geo., Guelph	Shorthorn.
Hulet, A. E., Norwich	Holstein-Friesian.
Hanton, A. R., Frankville	Holstein-Friesian.
Haley, M. H., Springford	Holstein-Friesian.
Harrison, Jas. E., Kincardine	Holstein-Friesian.
Haley, M. L., Springford	Holstein-Friesian.
Hartley, Thos., Downsview	Holstein-Friesian.
Hawse, W. H., Athens	Holstein-Friesian.
Hicks, R. F., Newton Brook	Holstein-Friesian.
Holgate, John A., Foxboro	Holstein-Friesian.
Honey, R., Brickley	Holstein-Friesian.
Hallman, A. C., Breslau	Holstein-Friesian.
Hanmer, E. E., Norwich	Holstein-Friesian.
Harrison, Geo., Kincardine	Holstein-Friesian.
Hartley, Miles, Norwich	Holstein-Friesian.
Holtby, Benj., Belmonte	Holstein-Friesian.
Hartley, W. A., New Durham	Holstein-Friesian.
Hartley, Stephen, New Durham	Holstein-Friesian.
Herron, J. H., Courtland	Holstein-Friesian.
Hewitt, Isaac, Plattsville	Holstein-Friesian.
Higginson, Wm., Inkerman	Holstein-Friesian.
Hopps, Benj., Campbellford	Holstein-Friesian.
Hopps, John, Campbellford	Holstein-Friesian.
Howe, F., Crampton	Holstein-Friesian.
Hoskin, Thos., The Gully	Holstein-Friesian.
Hubbs, Ernest A., Chisholm	Holstein-Friesian.
Hubbs, Louis P., Hillier	Holstein-Friesian.
Hubbs, Wm. A., Chisholm	Holstein-Friesian.
Hall, W., **Washington**	Aberdeen-Angus.

Name and Address.	Breed.
Harris, W. C., Gore's Landing	Aberdeen-Angus.
Hodgson, John, Mindemoya	Aberdeen-Angus.
Hamilton, John, Grand Fernier, Que.	Ayrshire.
Harwood, L. De. L., Vaudreuil	Holstein-Friesian.
Hanmer, Willoughby, New Durham	Holstein-Friesian.
Hardy Wellington, Roland, Man.	Ayrshire.
Hammill, H. C., Islay	Ayrshire.
Hardy, H., Bowesville	Ayrshire.
Hardy, C., Bowesville	Ayrshire.
Hay, Wm., Howick, Que.	Ayrshire.
Hendy, Chas., Campbellford	Ayrshire.
Hill, Geo., Delaware	Ayrshire.
Hodson, F. W., Toronto	Ayrshire, Hereford.
Howden, John, St. Louis de Gonzague, Que.	Ayrshire.
Hume & Co., A., Menie	Ayrshire.
Hunt, John, Russell	Ayrshire.
Hunter, Mrs. H. H., Reston, Man.	Ayrshire.
Hudson & Sons, John, Morton	Ayrshire.
Haldon Bros., Turgoose, B.C.	Ayrshire.
Harkness & Sons, Irena	Ayrshire.
Hunter & Sons, R., Maxville	Ayrshire.
Henderson, R. N., Morton, Ont.	Ayrshire.
Hamilton, W., Chesterville	Ayrshire.
Hughes, Jno. A., Peticodiac, N.B.	Ayrshire.
Harrison, Frank, Mt. Albert	Hereford.
Hunter, J. A., Durham	Hereford.
Hall, H. B., Lloydminster, Sask.	Hereford.
Hammell, W. H., Beeton	Hereford.
Hanna, E. W., Griswold, Man.	Hereford.
Henry, T. G., Mono Mills	Hereford.
Hillburn, W. & E., Kettleby	Hereford.
Hinde & Son, Wm., Harriston	Hereford.
Hunter, J. & J., Durham	Hereford.
Hunter, Oliver, Box 94, Pilot Mound, Man	Hereford.
Hunter, W. H., The Maples	Hereford.
Hunter, A. S., Durham	Hereford.
Hannell, E. D., Canyon, Texas, U.S.A.	Hereford.
Hudson, Arch., Soperton	Ayrshire.
Hagerman, B. E., Minto	Holstein-Friesian.
Hudson, Jos., Lyn	Ayrshire.
Hazlett, Wm., Hawkestone	Galloway.
Ironside, Henry W., Puslinch	Shorthorn.
Irving A., Scotstown, Que.	Ayrshire.
Irving, Thos., North Georgetown, Que.	Ayrshire.
Ibbotson, A. R., Beresford, Man.	Hereford.
Innes, P., Colbrook Station, N.S.	Ayrshire.
Irwin, H. D., Markdale	Galloway.
Immerson, C. J., Lyn	Ayrshire.
Johnston, Arthur, Greenwood	Shorthorn.
Jakes, J. C., Merrickville	Holstein-Friesian.
Jantzi, Jonathan, Baden	Holstein-Friesian.
Johnson, Wm., Delta	Holstein-Friesian.
Johnston, Wesley, Chesterville	Holstein-Friesian.
Jerome, Holbert, Glanford	Holstein-Friesian.
Johnson, J. W., Sylvan	Holstein-Friesian.
Johnston, Richard, Putnam	Holstein-Friesian.
Johnston, Henry, Frankville	Holstein-Friesian.
Johnson, Wm. H., Avon	Holstein-Friesian.
Jones, D., Jr., Caledonia	Holstein-Friesian.
James, J. A., Nilestown	Ayrshire.
James, D. A., Nilestown	Ayrshire.
Jackson, W. R., Buffalo, N.Y.	Ayrshire.
Jackson, J. E., Brome, Que.	Ayrshire.
Johnston, D. B., Lansdowne	Ayrshire.
Jackson, J. S., Ramosa	Hereford.
Jenkins, Jos., Pearceley	Hereford.
Jones, C. H., Saskatchewan Landing, Sask	Galloway.
Jickling, J. B., Carman, Man.	Galloway.
Jefferies, W. A., Sussex, N.B.	Ayrshire.
Kylie Bros., Ayr	Shorthorn.
Kelly, Arthur, Kelvin	Holstein-Friesian.
Kincaid, C. A., Barriefield	Holstein-Friesian.
Kingston, John, Sr., West Huntingdon	Holstein-Friesian.
Kennedy, A., Ayr	Holstein-Friesian.
Kitchen, S. G., St. George	Holstein-Friesian.
Kains, A., Byron	Ayrshire.
Kay, W. F., Phillipsburg, Que.	Ayrshire.
Kennedy & Sons, A., Vernon	Ayrshire.
Kinsey, Jos., Doon	Ayrshire.
Knight, Joshua, Elginburg	Ayrshire.
Kinsey, E., Doon	Ayrshire.
Klock, Alonzo, Aylmer	Ayrshire.

Keene, Wm. L., North Vancouver, B.C.	Ayrshire.
Kirkland, J., Estate, Westham Island, B.C.	Hereford.
Korry, Geo., Manion	Hereford.
Kerr, Wm., Galt	Galloway.
Lawrence, Joshua, Oxford Centre	Jersey.
Lawrence, J. R., Humber	————.
Leask, Jas., Greenbank	Shorthorn.
Lyons, S. J., Norval	Jersey.
Lowe, John, Elora	Aberdeen-Angus.
Lorch, Albert, Elmira	Holstein-Friesian.
Laidlaw, E. W. H., Aylmer	Holstein-Friesian.
Laidlaw, Geo. A., Aylmer West, Ont.	Holstein-Friesian.
Loucks, John E., Frankville	Holstein-Friesian.
Lemon, Samuel, Lyndon	Holstein-Friesian.
Lee, J. W., Simcoe	Holstein-Friesian.
Lester, H. A., Burford	Holstein-Friesian.
Loveless, R. M., Agincourt	Holstein-Friesian.
Locke, John, Campbellford	Ayrshire.
LeMaister, J. Coulston, Peribonica, Que.	Ayrshire.
Lachapelle, Nap., St. Paul l'Ermite, Que	Ayrshire.
Langelier, Gus. A., Cap Rouge, Que.	Ayrshire.
Legris, U., St. Leon, Maskinonge, Que.	Ayrshire.
Leitch, David, Cornwall	Ayrshire.
Logan, J. W., Allan's Corners, Que.	Ayrshire.
Lussier, Alp., St. Charles, Richelieu, Que.	Ayrshire.
Lavallee, Paul, Berthier, Que.	Ayrshire.
Legris, N., St. Jean de Maskinonge, Que.	Ayrshire.
Labissionnere, Louis, Champlain, Que.	Ayrshire.
Lyons, H., Berwick, N.S.	Ayrshire.
Lortie, Eugene, Quebec, Que.	Ayrshire.
Lussier, Arthur, Varennes, Que.	Ayrshire.
Leach, Robert, Watford	Hereford.
Lee, R. S., Williamsford	Hereford.
Leish, Wm. B., Watford	Hereford.
Little, Jas. D., Teeswater	Hereford.
Lovering, J. A., Lovering	Hereford.
Leeson, C. L., Varney	Hereford.
Lewis, T. D., Claresholm, Alta.	Hereford.
Long, W. L., Cando, N.D.	Hereford.
Lloyd-Jones Bros., Burford	Galloway.
Layng, H. A., Spring Valley	Holstein-Friesian.
Lamy, Adolphe, St. Leon, Que.	Ayrshire.
Lawrie, R. A., Morris, Man.	Galloway.
Leeson, F., Aylmer	Holstein-Friesian.
Lawrie, J. L., Morris, Man.	Galloway.
Lacerte, Geo., Spruce Grove, Alta.	Galloway.
Leavens, I. F., Foxwarren, Man.	Galloway.
Macklin, C. W., Centreton	Holstein-Friesian.
Mallory, B., Belleville	Holstein-Friesian.
Marshall, Richard, Lyn	Holstein-Friesian.
Mallory, J. M., Bloomfield	Holstein-Friesian.
Millar, Robert J., Fonthill	Holstein-Friesian.
Martin, R. B., Elmira	Holstein-Friesian.
Morrow, R. O., Hilton	Holstein-Friesian.
Mittlefehldt, A., Elcho	Holstein-Friesian.
Montmorency, G. de, Woodstock	Holstein-Friesian.
Moxley, Jas. H., Tilley	Holstein-Friesian.
Macklin, S., Streetsville	Holstein-Friesian.
Mallory, F. R., Frankford	Holstein-Friesian.
Manhard, G. H., Manhard	Holstein-Friesian.
Moorhead, J. G., Ventnor	Holstein-Friesian.
Mott, W. D., Lyn	Holstein-Friesian.
Martindale, W. N., Stanbridge East, Que	Ayrshire.
Millar, Wm., Marshfield, P.E.I.	Ayrshire.
Mackie, Wm., Agassiz, B.C.	Ayrshire.
Massey Est., W. H., Coleman	Ayrshire.
Mellick, Aaron, Smithville	Ayrshire.
Morrison, John R., Burnbrae	Ayrshire.
Montgomery, G. H., Phillipsburg, Que.	Ayrshire.
Muir, G. H., Bogie, Que.	Ayrshire.
Muir, Sr., A., Huntingdon, Que.	Ayrshire.
Mills, T. J., Maria, Que.	Ayrshire.
Marsh & Son, Wm., Gladstone	Ayrshire.
Marsh & Son, E., Gladstone	Ayrshire.
Mackie Bros., Eburne, B.C.	Ayrshire.
Marion, Dr. A., Montreal, Que.	Ayrshire.
Massicotte, Clair, St. Prosper, Que.	Ayrshire.
Mitchell, Wm., Bainsville	Ayrshire.
Morden, A. A., Wellington	Ayrshire.
Morrin, John, Belle Riviere, Que.	Ayrshire.
Murray, Ben., Martintown	Ayrshire.
Mousseau, J. Bte., Berthier, Que.	Ayrshire.
Merrills, D. E. A., Warkworth	Holstein-Friesian.
Michener, E., Red Deer, Alta.	Ayrshire.
Mathiew, Ferrier, Lachenaie, Que.	Ayrshire.
Murphey, W. J., Rockburn, Que.	Ayrshire.

Name and Address.	Breed.
Moodie, Wm., DeWinton, Man.	Ayrshire.
Montgomery, Elgin, South Mountain	Ayrshire.
Morrin, Thos., Lachute, Que.	Ayrshire.
Michener, Martin, Summerstown	Ayrshire.
Monro, Wallace, Millbrook, N.S.	Ayrshire.
Moore, Chas. C., Kingsville	Ayrshire.
Morgan, Harold P., Montreal, Que.	Ayrshire.
Mace, S. M., Pekisko, Alta.	Hereford.
Mackie, R. J., Oshawa	Hereford.
Morrison, Jas., Longburn, Man.	Hereford.
Marples, J. E., Deleau, Man.	Hereford.
Miller, W. J., Solsgirth, Man.	Hereford.
Mais, L. V. B., Fort Qu'Appelle, N.W.T.	Galloway.
Morris, F. M., Rosewood, Man.	Galloway.
Montle, J. M., Stanstead, Que.	Holstein-Friesian.
McNabb, John, Rockwood	Shorthorn.
McCallum, Jas., Amulree	Shorthorn.
McKinnon, Alex., Conningsby	Aberdeen-Angus.
MacDougall, H., Guelph	Aberdeen-Angus.
McCuaig, M., Vankleek Hill	Holstein-Friesian.
McNeil, C. A., Wilstead	Holstein-Friesian.
McDonald, John, Dartford	Holstein-Friesian.
McKillican, W. E., Vankleek Hill.	Holstein-Friesian.
McMillan, D. J., Laggan	Holstein-Friesian.
McQueen, T. W., Tillsonburg	Holstein-Friesian.
MacIntyre, G., Renfrew	Holstein-Friesian.
McCrea, J. L., Brockville	Holstein-Friesian.
McDonald, Allan, Ormond	Holstein-Friesian.
McDonald, P. A., Ormond	Holstein-Friesian.
McLean, J. H., Inkerman	Holstein-Friesian.
McKinnon, A., Hillsburg	Aberdeen-Angus.
McKinnon, R., Coningsby	Aberdeen-Angus.
McKinney, Alexander, Erin	Aberdeen-Angus.
McLoud, Jas. A., Plainville	Aberdeen-Angus.
McCallum, T. D., Danville, Que.	Ayrshire.
McCartney, Thos., Longburn, Man.	Ayrshire.
McCormick, J. W., Morewood	Holstein-Friesian.
McGhee, Robt., Beachville	Holstein-Friesian.
McGhee, S. J., Beachville	Holstein-Friesian.
McDonald, John, Shubenacadie, N.S.	Ayrshire.
McDonald, John, New Glasgow, N.S.	Ayrshire.
McDowell, W. H., Crompton, Que.	Ayrshire.
McIntyre Bros., Sussex, N.B.	Ayrshire.
McFarlane, D. A., Kelso, Que.	Ayrshire.
McKee, H. & J., Norwich	Ayrshire.
MacDonald, Sir Wm., St. Anne de Bellevue	Ayrshire.
McLeod, W. D., Kirkhill	Ayrshire.
McIntosh, Peter, Cass Bridge	Ayrshire.
McQuat, Jas., Brownsburg, Que	Ayrshire.
McCormack, Jas., & Son, Rockton	Ayrshire.
MacDonald College, St. Anne de Bellevue	Ayrshire.
McFarlane, Robert, Howick Station, Que.	Ayrshire.
McKee, John, Norwich	Ayrshire.
McKericher, D. G., Howick, Que.	Ayrshire.
McMillan, D. E., Laggan.	Ayrshire.
McArthur, P. D., Howick Station, Que.	Ayrshire.
McMillan, D. P., Box 38, Alexandria	Ayrshire.
McAlpine, J. H., Lower Cambridge, N.B.	Ayrshire.
McMannus, Dr., Blackville, N.B.	Ayrshire.
McCubbin, Alex., Grand Freniere, Que.	Ayrshire.
McIntyre, A. W., Newington	Ayrshire.
McMaster, J. A., Summerstown	Ayrshire.
McDermid, J. A., Stayner	Hereford.
McLean, W. J., Elmgrove	Hereford.
McDermid, J. A. & P., Stayner	Hereford.
McDiarmid, P. T., Duntroon	Hereford.
McKenzie, Jas., Burnside, Man.	Hereford.
McLeish, R. B., Lacombe, Alta.	Hereford.
McLeod, A. R., Shoal Lake, Man.	Hereford.
McConkey, R. J., Stroud	Hereford.
McCraken, Jas., Staples	Hereford.
McGinnes, T. C., Iberville, Que.	Ayrshire.
McLean, Gordon, Athens	Holstein-Friesian.
McDowell, M., Norwich	Holstein-Friesian.
McMaster, D. E., Laggan	Holstein-Friesian.
McViety, M. H., Ottawa	Ayrshire.
McMillan, Thos., Lineham, Alta.	Galloway.
McCrae, D., Guelph	Galloway.
McCormack, D. A., Allans Corners, Que.	Ayrshire.
McLachlan Bros., Arnprior	Ayrshire.

North, Geo., Marden	Holstein-Friesian.
Nichols, Ira, Norwich	Holstein-Friesian.
Nixon, F. A., Price's Corners	Aberdeen-Angus.
Norman, Wm., Thornhill	Holstein-Friesian.
Ness, Robert, Howick, Que.	Ayrshire.
Ness, R. R., Howick, Que.	Ayrshire.
Neely, Robert, Dorchester Station, Que.	Ayrshire.
Ness, D. T., Howick, Que.	Ayrshire.
Nesbitt, W. H., Roland, Man.	Ayrshire.
Newman, Thos., Calgary, Alta.	Ayrshire.
Nicol, Thomas, Simcoe	Galloway.
Nation, I., Souris, Man.	Ayrshire.
Nunnick, W., Brantford	Holstein-Friesian.
Oliver, Geo., Bright	Holstein-Friesian.
Oke, Geo. H., Alvinston	Shorthorn.
Opperthauser, N., Hanover	Aberdeen-Angus.
O'Brien, John, London West	Aberdeen-Angus.
Owens, Hon. Wm., Montreal, Que.	Ayrshire.
Ouimet, Clovis, St. Francois de Salles, Que.	Ayrshire.
Ouimet, A., St. Francois de Salles, Que.	Ayrshire.
Owens, W. S., Antrim	Ayrshire.
Ogilvie, W. W., Lachine Rapids, Que.	Ayrshire.
Ouimet, Wilfred, St. Rose, Que.	Ayrshire.
Ouimet, E., St. Rose, Que.	Ayrshire.
Oliver, Thos., Bagot, Man.	Hereford.
O'Neill Bros., Southgate	Hereford.
Oldham, W. J., Mt. Albert	Hereford.
Ontario Agricultural College, Guelph	All breeds.
Parkinson, G. & W., Eramosa	Shorthorn.
Parkinson, L., Eramosa	Shorthorn.
Pettit, W. G., & Sons, Freeman	Shorthorn.
Palmer, B. J., New Durham	Holstein-Friesian.
Preston, A. J., Athens	Holstein-Friesian.
Patten, J. H., Paris	Holstein-Friesian.
Pettit, F. C., Burgessville	Holstein-Friesian.
Patten, Walter, St. George	Holstein-Friesian.
Poole, Samuel, Norwich	Holstein-Friesian.
Pearce, W. M., Tillsonburg	Holstein-Friesian.
Philip, W. A., Penryn	Holstein-Friesian.
Pettes, Jas. C., West Brome, Que.	Holstein-Friesian.
Prouse, Geo. T., Ostrander	Holstein-Friesian.
Pannabecker, E., Hespeler	Holstein-Friesian.
Pettes, F. N., L'Artifice, Que.	Holstein-Friesian.
Patterson, M., Almonte	Holstein-Friesian.
Poole, Chauncey, Norwich	Holstein-Friesian.
Pettit, F. E. Burgessville	Holstein-Friesian.
Prouse, Wm., Dereham Centre	Holstein-Friesian.
Pound, W. F., Bayham	Holstein-Friesian.
Paul Bros., Chrysler	Ayrshire.
Pope. J. C, Regina, Assa.	Ayrshire.
Patenaude, P., St. Remi, Que.	Ayrshire.
Parlee, M. S., Sussex, N.B.	Ayrshire.
Parker, W. D., Hatley, Que.	Ayrshire.
Paton, Hugh, Montreal, Que.	Ayrshire.
Phaneuf, Antoine, St. Antoine, Que.	Ayrshire.
Provincial Stock Farm, Charlottetown, P.E.I	Ayrshire.
Purcell, Daniel, Huntingdon, Que.	Ayrshire.
Parlee, M. H., Sussex, N.B.	Ayrshire.
Parsons, J. F., & Son, Barnston, Que.	Ayrshire.
Petehs, John M., West Brome, Que.	Ayrshire.
Parker, A. H., Frankville	Holstein-Friesian.
Proulx, Leopold, St. Ours, Que.	Ayrshire.
Proulx, Felix, St. Ours, Que.	Ayrshire.
Provest, Felix, Varennes, Que.	Ayrshire.
Paria, J. E., Parisville	Ayrshire.
Palmer, Geo. R., Summerstown	Ayrshire.
Penhall, R. J., Nober	Hereford.
Palmer, Oswald, Lacombe, Alta.	Hereford.
Parker, John T., Lethbridge, Alta.	Hereford.
Phillip, A. E., Brandon, Man.	Hereford.
Popplewood, Rich., Elliott	Hereford.
Purdy, D. A., Lumsden, Sask.	Hereford.
Perdue, H. T., Wingham	Hereford.
Perrey, W. R., St. Marys-Cardston, Alta.	Galloway.
Potter, Chas. L., Duagh, Alta.	Galloway.
Patton, J. A., Rocklyn, Ont.	Hereford.
Pineo, W. W., Waterville, N.S.	Galloway.
Quadd, Fred., Dunlop	Hereford.
Rennie, J., & Sons, Blackwater	Shorthorn.
Richardson, And., Guelph	Shorthorn.
Row, Fred., Curries	Holstein-Friesian.
Robinson, A. E., Markham	Holstein-Friesian.
Rooke, Geo., Dereham Centre	Holstein-Friesian.
Richardson, F. R., Billings Bridge	———.
Robertson, N. S., Arnprior	Shorthorn.
Reesor, F. E. N., Locust Hill	Holstein-Friesian.

NAME AND ADDRESS.	BREED.
Rice, Alfred, Woodstock	Holstein-Friesian.
Richardson, J. W., Caledonia	Holstein-Friesian.
Rife, David, Hespeler	Holstein-Friesian.
Rettie, Jas., Norwich	Holstein-Friesian.
Rice, Geo., Tillsonburg	Holstein-Friesian.
Richardson, Matt., Caledonia	Holstein-Friesian.
Ripley, H., Elgin	Holstein-Friesian.
Rivers, Welburn, Foldens	Holstein-Friesian.
Robinson, Chas., South Mountain	Holstein-Friesian.
Robertson, J. W., Vankleek Hill	Holstein-Friesian.
Rutherford, J. C., Kemptville	Holstein-Friesian.
Rosebrugh, Jas., St. George	Holstein-Friesian.
Robinson, T., & Son, Dunsford	Aberdeen-Angus.
Ritchie, Geo. A., Plainville	Aberdeen-Angus.
Reid & Co., Hintonburg	Ayrshire.
Robertson, R., North Georgetown, Que.	Ayrshire.
Rannie, C., Menie	Ayrshire.
Rannie, Wm., Menie	Ayrshire.
Roach, J. F., Sussex, N.B.	Ayrshire.
Ruel, J. B., St. Remi, Napierville Co., Que.	Ayrshire.
Rivet, Chas., Jolliette, Que.	Ayrshire.
Robertson, Adam, Como, Que.	Ayrshire.
Rovlston, Geo. W., Evyln	Ayrshire.
Rattie, Jos., St. Augustine, Que.	Ayrshire.
Rathee, Chas., Three Hills, Alta.	Hereford.
Randell, Ralph, Shoal Lake, Man.	Hereford.
Reaman, I., Concord	Hereford.
Reed, H., Mimosa	Hereford.
Reed, J. W., Olds, Alta.	Hereford.
Reid, H. & J., Epping	Hereford.
Reid, Thos. H., Holstein	Hereford.
Reid, John H., Moosomin, Sask.	Hereford.
Ritchie, W. L., Saurin	Hereford.
Rendell, J., & Sons, Highgate	Hereford.
Richardson & Giles, Rush Lake, Man.	Hereford.
Robinson, Tyson, Como, Que.	Ayrshire.
Robertson, R., Nappan, N.S.	Ayrshire.
Rathbun, Co., Deseronto	Ayrshire.
Ross, J. & J. C., Medicine Hat, Sask.	Hereford.
Reid, F. P., Mobeetie, Texas, U.S.A.	Hereford.
Reid, D. D., Canora, Sask.	Hereford.
Roach, Mrs. Sarah, Sussex, N.B.	Ayrshire.
Sparrow, R. C., & Sons, Antrim	Shorthorn.
Spratt, T. A., Billing's Bridge	Holstein-Friesian.
Stewart, Peter, Everton	Shorthorn.
Snell & Lyons, Norval	Jersey.
Smith, A. W., Maple Lodge	Shorthorn.
Stringer, Abe., Kingarf	Shorthorn.
Schmidt, A. D., Elmira	Shorthorn.
Shortreed, Black & Armstrong, Fergus	Aberdeen-Angus.
Storry, Dobson, Markham	————.
Stone, Jos., Saintfield	Shorthorn.
Simmons, W. H., New Durham	Holstein-Friesian.
Smith, Wm. C., New Durham	Holstein-Friesian.
Stauffer, F., Washington	Holstein-Friesian.
Shearer, Wm. S., Listowel	Holstein-Friesian.
Stewart, Fred., Elfrida	Holstein-Friesian.
Stewart, John, Delta	Holstein-Friesian.
Summerfehldt, L., Unionville	Holstein-Friesian.
Stephens, Byron, Brigden	Holstein-Friesian.
Schell, W. S., Woodstock	Holstein-Friesian.
Stanton, Chas., Springford	Holstein-Friesian.
Shunk, Wm., Sherwood	Holstein-Friesian.
Smith, Wm. E., Burgessville	Holstein-Friesian.
Smith, S. E., Dundas	Holstein-Friesian.
Smith, John C., Madoc	Holstein-Friesian.
Sonley, T. H., Manilla	Holstein-Friesian.
Stevenson, R. S., Ancaster	Holstein-Friesian.
Slaght, Wm., Bealton	Holstein-Friesian.
Stewart, Hugh, Ormond	Holstein-Friesian.
Sifton, Chas., Cairngorm	Holstein-Friesian.
Stewart, J. W., Lyn	Holstein-Friesian.
Suhring, Wm., Sebringville	Holstein-Friesian.
Sharp, Jas., Rockside	Aberdeen-Angus.
Sandilands, John, Williamstown	Ayrshire.
Simpson, Jas., South Augusta	Ayrshire.
Sims, John, Melbourne Ridge, Que.	Ayrshire.
Smith, Wm., Scotland	Ayrshire.
Stokes, John, Tweed	Ayrshire.
Steacy, R. G., Lyn	Ayrshire.
Steel Bros., Glenboro, Man.	Ayrshire.
Seminary de Quebec, Quebec	Ayrshire.

Smith, R. W., Clanbrassail	Ayrshire.
Standish, Jas., Warden, Que.	Ayrshire.
Stephen, W. F., Huntingdon, Que.	Ayrshire.
Snetsinger, J. Wilson, Newington	Ayrshire.
Stewart, Wm., & Co., Menie	Ayrshire.
Slater, Bruce, Inkerman	Holstein-Friesian.
Stewart, Jas. A., Menie	Ayrshire.
Smith, Geo. W., Dundas	Holstein-Friesian.
Senecall, C., St. Maie, Que.	Ayrshire.
Shaw, W. A., Foxboro	Holstein-Friesian.
Shirreff, Wm. & G. G., Clarence	Ayrshire.
Smith, C. E., Scotland	Holstein-Friesian.
Smith, Mrs. A. W. & John Wilson, Simcoe	Ayrshire.
Stevens, Wm. C., Philipsville	Holstein-Friesian.
Steele, W. J., Newington	Ayrshire.
Stillman, Robert, Campbellford	Holstein-Friesian.
Sanborn, J. F., & Son, South Roxton, Que.	Ayrshire.
Sturgeon, R. G., Manhard	Holstein-Friesian.
Safford, W. R., Sutton Jct., Que.	Ayrshire.
Schofield, E. Allan, St. John, N.B.	Ayrshire.
Schofield, David, Blackville, N.B.	Ayrshire.
Seminaire St. Therese, St. Therese, Que.	Ayrshire.
Simms, A. Haig, Montreal, Que.	Ayrshire.
Simmons Bros., Charlottetown, P.E.I.	Ayrshire.
Stewart, T. A., Hemmingford, Que.	Ayrshire.
Sanderson, Erie, Cowley, Alta.	Hereford.
Shannon Bros., Arnprior	Hereford.
Shouldice, Jas., Gleichan, Alta.	Hereford.
Sinton, Robert, Regina, Sask.	Hereford.
Skippon, Thos., Hyde Park	Hereford.
Smith, H. D., Compton, Que.	Hereford.
Stone, Alf., Guelph	Hereford.
Saunders, Isaac, Morden, Man.	Hereford.
Stone Stock Co., F. W., Guelph	Hereford.
Stutt, R. W., Forest	Hereford.
Sims, Edwin, Woodroyd, Man.	Hereford.
Stutt, Wm., Forest	Hereford.
Squire, Wm., Amherstburg	Hereford.
Sutherland, A., Bond Head	Hereford.
Smith, A., Hawkstone	Hereford.
See, R. S., Williamsford	Hereford.
Shields, Wm., Brandon, Man.	Hereford.
Smith, H. D., Hamilton	Hereford.
Smith, Fred., Brandon, Man.	Hereford.
Shaw, Robert, Brantford	Galloway.
Sibbald, John, Annan	Galloway.
Telfer, Thos. G., Ingersoll	Holstein-Friesian.
Truesdall, J. D., Spring Valley	Holstein-Friesian.
Tackell, Wm., Zenda	Holstein-Friesian.
Taylor, J. H., Scotland	Holstein-Friesian.
Thomson, A. J., Erin	Aberdeen-Angus.
Teeple, A. H., Curries	Holstein-Friesian.
Thomson, Peter, Hillsburg	Aberdeen-Angus.
Thompson, A. J., Hoards	Holstein-Friesian.
Taylor, F. W., Wellmans Corners, Que.	Ayrshire.
Thompson, Jas. A., South Lake	Holstein-Friesian.
Thorn, Wm., Lynedoch	Ayrshire.
Thompson, S. J., & Sons, St. James, Man.	Ayrshire.
Tipping, J. A., Clarenceville, Que.	Ayrshire.
Trappiste Fathers, LaTrappe, Oka, Que.	Ayrshire.
Tran, W. H., Cedar Grove	Ayrshire.
Treverton, Thos. C., Pouchers Mills	Ayrshire.
Trudel, T., St. Prosper, Que.	Ayrshire.
Turenne, Delphis, St. Paul l'Ermite, Que.	Ayrshire.
Tourigney, Paul, Victoriaville, Que.	Ayrshire.
Thibeadeau, Damase, Thurso, Que.	Ayrshire.
Tremblay, A. A., Les Eboulements, Que.	Ayrshire.
Tyler, T. G., Abercorn, Que.	Ayrshire.
Tait, Wm., Pilot Mound, Man.	Hereford.
Thompson, E. A., Wakopa, Man.	Hereford.
Tough, Jas., Edmonton, Alta.	Hereford.
Underwood, John, Grafton	Aberdeen-Angus.
VanPatter, J. M., Luton	Holstein-Friesian.
Varcoe, John, Carlow	Aberdeen-Angus.
Varey, E. B., Woodstock	Holstein-Friesian.
Wallace, Jas. S., Glen Morris	Shorthorn.
Waldie, Wm., Stratford	————.
Wilson, Thos., Guelph	Grades.
Willsie, Jacob, Thedford	Grades.
Wright, Dan., Ponsonby	Shorthorn.
Webster, D. M., Athens	Holstein-Friesian.
Wiltse, Ford B., Athens	Holstein-Friesian.
Willson, W., Plainville	Aberdeen-Angus.
Watt, John, Allan's Corners, Que.	Ayrshire.
Walker, A. T., Beaconsfield	Holstein-Friesian.
Walters, Wm. G., Thorndale	Holstein-Friesian.

Name and Address.	Breed.
Welsh, Henry, Weston	Holstein-Friesian.
Willis, R., Jr., Aylmer	Holstein-Friesian.
Wyckoff, I. G., Tyrrell	Holstein-Friesian.
Wagler, C., Baden	Holstein-Friesian.
Walker, R. W., Utica	Holstein-Friesian.
Weller, A. E., Kingston Jct.	Holstein-Friesian.
Williams, Chas., Ostrander	Holstein-Friesian.
Wilson, Howard, Russell	Holstein-Friesian.
Wylie, Jas. H., Almonte	Holstein-Friesian.
Wallace, J. Alex., Simcoe	Holstein-Friesian.
Wallace, Jeremiah, Jr., Shanly	Holstein-Friesian.
Ward, R. G., Springville	Holstein-Friesian.
Woodley, Elmer V., Waterford	Holstein-Friesian.
Woodley, Geo. G., Villa Nova	Holstein-Friesian.
Woof, W. L., Hillier	Holstein-Friesian.
Warnica, Asa., Painswich, Ont.	Hereford.
Wells, A. C., & Son, Chilliwack, B.C.	Ayrshire.
Wood, And., Vankleek Hill	Ayrshire.
Wood, Walter J., Short Hills, N.W.T.	Ayrshire.
Whittaker, H. J., North Williamsburg	Ayrshire.
Willoughby, Mrs. H. G., Saskatoon, Sask.	Ayrshire.
Wilson, J. Lockie, Alexandria	Ayrshire.
Woodisee Bros., Rothsay	Ayrshire.

Name and Address.	Breed.
Walker, Thos., Jr., Wellman's Corners	Ayrshire.
Watt, D. M., Allan's Corners, Que.	Ayrshire.
Wood, J. A., Genoa, Que.	Ayrshire.
Will, John, Ft. Covington, N.Y., U.S.A.	Ayrshire.
Williams, Louis, North Ridge	Ayrshire.
Whitehead, E. R., Montmorency Falls, Que.	Ayrshire.
Wallace, John, Cartwright, Man.	Hereford.
Warnica, Asa. H., Painswick	Hereford.
Whitman Bros., Canyon, Texas, U.S.A.	Hereford.
Wigle, A., Kingsville	Hereford.
Wilcox, F. J., Lamerton, Alta.	Hereford.
Wright, Herbert, Guelph	Hereford.
Wilcox, Frank, Bond Head	Hereford.
Wright, H. I., Canora, Sask.	Galloway.
Wright, I. W., Astwood, Sask.	Galloway.
Wooley, E. H., Box 303, Simcoe	Ayrshire.
Watson, Thos., Howick, Que.	Ayrshire.
White, Wm., Bloomfield	Ayrshire.
Young, Samuel, Guelph	Aberdeen-Angus.
Yates, Mahlon, Athens	Ayrshire.
Yates, A., Athens	Ayrshire.
Young, R., Bowesville	Ayrshire.
Zoeller, A. M., New Hamburg	Holstein-Friesian.

MEMBERS OF DOMINION SHEEP BREEDERS' ASSOCIATION FOR 1906 AND 1907.

Name and Address.	Breed.
Andrews, Geo., Inverness, Que.	Leicesters.
Arkell, Henry, & Son, Arkell	Oxfords.
Armstrong, Jas., Shawville, Que.	Oxfords.
Armstrong, W. A., Shawville, Que.	Leicesters.
Armstrong, A. A., Minnesing	Shropshires.
Balsden, Jno. I., Markham	Cotswolds.
Baker, G. W. A., Trafalgar	Dorsets.
Baxter, David, North Georgetown, Que.	Leicesters.
Bailey, H. C., Cookshire, Que.	———.
Barr, John, Blyth	———.
Baker, Geo., Simcoe	Southdowns.
Bagshaw, W. A., Uxbridge	Cotswolds.
Bartlett, H., Smithville	Dorsets.
Beith, Robert, Bowmanville	———.

Name and Address.	Breed.
Brethour, J. E., Burford	———.
Bertrand, Benjamin, St. Hermas, Que.	Shropshires.
Bellerose, Dephis, Ste. Elizabeth, Que.	Cotswolds.
Bellemare, Adrien, Yamachiche, Que.	Leicesters.
Benning, J., Williamstown	Leicesters.
Bennett, D., Russelton	Shropshires.
Beattie, W. H., Wilton Grove	Shropshires.
Breen, J. F., Melancthon	Leicesters.
Bright, John, Myrtle	Cotswolds & Shropshires.
Bryson, Jas., Brysonville, Que.	Leicesters.
Brisson, Tuffle, Warwick, Que.	Leicesters.
Brien, W., & Son, Ridgetown	Cotswolds.
Bowman, Jas., Guelph	Suffolks & Dorsets.
Brosseau, E. C., Brosseau Station, Que.	Oxford Downs.

Brown, David, St. Jochim De Mont., Que.	Leicesters.
Boudet, Jos., Victoriaville, Que.	Leicesters.
Brown, F. W., Portage La Prairie, Man.	Cotswolds.
Bolton, John, Guelph	————.
Booth, Geo. K., Melboro, Que.	Leicesters.
Brown, A., & Son, Beachburg	Oxfords.
Bourassa, Theodore, Kinnear's Mills, Que.	Leicesters.
Campbell, John, Woodville	Shropshires.
Campbell, Peter J., Breadalbane	Leicesters.
Chartier, Albert, St. Paul l'Ermite, Que.	Oxfords.
Camirand, Louis, Pointe-du-Lac, Que.	Leicesters.
Castonguay, A., St. Roch des Aulnaies, Que.	Leicesters
Campbell, P. M., Balderson	Oxfords.
Carpenter, W. S., Simcoe	Shropshires
Campbell, Mac., Harwich	Leicesters.
Cleland, Jas. R., Genoa, Que.	Leicesters.
Christie, Peter, Manchester	Shropshires.
Cox, T. A., Brantford	————.
Cottrelle, G. R., Milton	Leicesters.
Cousins, John, & Son, Harriston	Oxfords.
Cloutier, Jos., Riviere Aux Chiens, Que.	Leiçesters
Couture, Jos., St. Ambroise, Que.	Leicesters.
Coutu Pierre, St. Felix de Valois, Que.	Cotswolds.
Couture, Frs., St. Augustin, Que.	Leicesters.
Coke, Jas., Erin	Cotswolds.
Connell, Tim., Vine	Cotswolds.
Crozier, A., Beachburg	Leicesters.
Cloutier, N., Bantier de Trois Rivieres, Que.	Leicesters.
Davidson, Jos., East Hatley, Que.	Leicester.
Draper, J. C., Sutton Juct., Que.	Shropshires.
Davidson, J. D., Belhaven	Cotswolds.
Denis, Arsene, St. Norbert, Que.	Lincolns, Cotswolds, Shropshires & Leicesters.
Dryden, Wm., Brooklin	Shropshires.
Dryden, John, Toronto	Shropshires.
Dickson, Jas., Orono	————.
Dryden, John, & Son, Brooklin	Shropshires.
Dickenson, J. H., N. Glanford	Shropshires.
Douglas, Jas., Caledonia	Leicesters.
Downey, Jas., Fordwich	Leicesters.
Drummond, Sir Geo., Beaconsfield, Que.	Southdowns.
Evans, D., & Son, Somenos, B.C.	Southdowns.
Edwards, Geo. B., Covey Hill, Que	Leicesters.
Edwards, J. Nelson, Clarence	Shropshires.
Easton, Abram, Appleby	Leicesters.
Ellard, Wright, Kazubazua, Que.	Leicesters.
Frank, R. W., Kingsbury, Que.	Leicesters.
Fisher, Hon. Sydney, Ottawa	Shropshires.
Fitch, Val., Oriel	Cotswolds.
Foster, J. G., Myrtle	————.
Fontaine, Francois, Notre Dame de Stanbridge, Que.	Leicesters.
Fortin, Joseph, Baie St. Paul, Que.	Leicesters.
Forster Farm, Oakville	Dorsets.
Gardhouse, J. M., Weston	Leicesters.
Garbutt, R. J., Belleville	Leicesters.
Gardhouse, J., & Son, Highfield	Leicesters.
Gamley, A. D., Griswold, Man.	Leicesters.
Gray, Geo., Cass City, Mich.	————.
Glass, Jas., Rodham, Que.	Leicesters.
Geary, Jno., London	Lincolns.
Green, Geo., Fairview	————.
Gibson, J. T., Denfield	Lincolns.
Gilroy, Jas. H., Coe Hill	————.
Goodall, Wm., St. Louis de Gonzaque, Que.	Leicesters.
Gouin, P. A., Trois Rivieres, Que.	Shropshires.
Gurney, C. G., Paris	————.
Geurard, Nedaige, St. Felix de Valois, Que.	Cotswolds.
Harding, R. H., Thorndale	Dorset Horns.
Hanmer, J. G., Brantford	Shropshires.
Hanmer, D. G., Mt. Vernon	Shropshires.
Hastings Bros., Crosshill	Leicesters.
Hastings, H. C., St. Armand, Que	Leicesters.
Hall, J. W., Bensford	Leicesters.
Hood, G. B., Guelph	Leicesters.
Holmes, C. F., Derby, Vt., U.S.A.	Leicesters.
Hunter, Thos., Venice, Que.	Shropshires.
Hunter, John, Wyoming	Dorsets.
Irving, A., Scotstown, Que.	Leicesters.
Jackson, John, & Son, Abingdon	Southdowns.
Jamieson, A. S., Clapham, Que.	Leicesters.
Jackson, T. S., Trafalgar	Dorsets.
Jeffs, E., & Son, Bond Head	Southdowns & Leicesters.
Jones, Wm., Zenda	————.
Johnston, Arthur, Greenwood	Cotswolds.
Johnston, Jas., Trafalgar	Dorset Horns.

NAME AND ADDRESS.	BREED.
Johnston, Peter, Inverness, Que.	Leicesters.
Kelly, John, Shakespeare	Hampshires & Leicesters
Kelley, Frank, Aylmer	———.
Lachapelle, Nap., St. Paul l'Ermite, Que.	Leicesters.
Lachapelle, Edouard, St. Paul l'Ermite, Que.	Leicesters & Cotswolds.
Lamarche, H., St. Esprit, Que.	Leicesters.
Langmaid, W. J., Taunton	Cotswolds.
Leonard, Chas., Corning, Iowa	———.
Legris, Uldirac, St. Leon, Que.	Shropshires.
Letourneau, Eudore, Ste. Famille, Que.	Leicesters.
Lee, J. W., & Son, Simcoe	Oxfords.
Linton, J., Arva	Lincolns.
Lyster, C. N., Kirkdale, Que.	Leicesters.
Lloyd-Jones Bros., Burford	Shropshires.
Luxton, A. G. H., Milton West	Dorset Horns.
May, John, Melbourne, Que.	Leicesters.
Mayhew, Orian, Canterbury, Que.	Leicesters.
Mandoza, Albert, St. Esprit, Que.	Leicesters.
Marshall, D. H., Snelgrove	Cotswolds.
Martin, Toussaint, St. Laurent, Que.	Leicesters.
Malpass, Wm., Mossley	Cotswolds.
Mitchell, Jno., Glencoe	———.
Miller, Jos. Ephraim, Greenbush	Oxfords.
Milot, Hercule, Yamachiche, Que.	Oxfords.
Middleton, C. B., Clinton	Leicesters.
Milot, Honore, Yamachiche, Que.	Cotswolds.
Milne, R., & Son, Green River	Shropshires.
Monkman, W. D., Bond Head	Shropshires.
Morrin, D. T., Lachute, Que.	Leicesters.
Morgan, L. E., Milliken	Cotswolds.
McCrae, D., Guelph	Southdowns & Cotswolds.
McLaren, P. S., McGarry	Oxfords.
McAllister, W. E., Durham	Leicesters.
McEwen, Col. R., Byron	Southdowns.
McLean, John G., Beachburg, Que.	Oxfords.
McKillican, W. E., Vankleek Hill	Leicesters.
McKirryher, Jos., Hallerton, Que.	Cotswolds.
McMillan, D., Priceville	Leicesters.
McDonald, Rod'k., Manitowaning	Cotswolds.
McRobie, Fred., Iroquois	Leicesters.
McDonald, Kenneth, Ridgetown	———.
McCue, Jas., & Son, Melanchton	Leicesters.
Nadeau, Louis A., Iberville, Que.	Leicesters.
Nelson, T. C., Dartford	Dorsets.
Nicholls, Jas. H., Dundalk	———.
Nichol, Robt., Brussels	Leicesters.
Noiseux, Frederich, St. Cesaire, Que.	Leicesters.
Oak Park Stock Farm Co., Brantford	———.
Parkinson, Ernest, Eramosa	Lincolns.
Parkinson, L., Eramosa	Lincolns.
Patrick, J. H., Ilderton	Lincolns.
Parnell, Isaac, Spring Road, Que.	Leicesters.
Pare, Augustin, Riviere au Chiens, Que.	Leicesters.
Partridge, A. W., Crown Hill	Leicesters.
Parkinson, G. & W., Eramosa	Leicesters.
Pettit, W. G., & Sons, Freeman	Shropshires.
Pelletier, Odilion, St. Roch des Aulnaies	Leicesters.
Prince, Oliver, Robinson (Bury), Que.	———.
Pichette, Donat, St. Esprit, Que.	Cotswolds.
Proulx, Leopold, St. Ours, Que.	Shropshires.
Provencher, E., St. Norbert d'Arthabaska	Leicesters.
Potter, A. B., Montgomery, Sask.	Leicesters.
Purcell, John, Huntingdon, Que.	Leicesters.
Purves Bros., Lucknow	Leicesters.
Quain, John, Reedsdale, Que.	Leicesters.
Rawlings & Bailey, Forest	Cotswolds.
Reed, Isaac, Ardtrea	Leicesters.
Richardson, J. A., South March	Oxfords.
Rivet, Avila, St. Esprit, Que.	Leicesters.
Riopel, Aime, St. Esprit, Que.	Hampshires & Leicesters.
Ross, T. H., Burford	———.
Ross, John, Kinnears Mills, Que.	Leicesters.
Rolfe, Albert C., Lime Ridge, Que.	Leicesters & Cotswolds.
Robinson, Chas., Odell Town, Que.	Cotswolds.
Rooney, Peter, Kinnears Mills, Que.	Leicesters.
Roberge, Jacques, St. Pierre d'Orleans, Que.	Leicesters.
Robertson, Jas., & Sons, Milton	Dorsets.
Rowatt, John T., Wyevale	Shropshires.
Robertson, John, Wyoming	Shropshires.
Rudell, A., Hespeler	Shropshires.
Rudd, C. C., Eden Mills	Cotswolds.
Saunders, C. F., Burford	———.
Shaw, Robert, Brantford	———.
Saunders, D. D., Arthur	Leicesters.

Sampson, Dr. Edgar, Toronto	———.
Snell & Lyons, Norval	Cotswolds.
Stevens, J. M., Bedford, Que.	Leicesters.
Stevens, A. J., Bedford, Que.	Leicesters.
Senecal, L. C., St. Marcde Vercheres	Leicesters.
Snell, Jas., Clinton	Leicesters.
Stevenson, A., Atwood	Oxfords.
Smith, A. W., Maple Lodge	Leicesters.
Smith, C. M., Lacombe, Alta.	Oxford Downs.
Smith, W. M., Scotland	———.
Shireff, Wm. & G. G., Clarence	Shropshires.
Smith, John, Beachville	Leicesters.
Stinson, R. H., Hornings Mills	Cotswolds.
Shortreed, Black & Armstrong, Fergus	———.
Somers, Daniel, Gilbert Plains, Man.	Leicesters.
Strong, W. C., North Sutton, Que.	Leicesters.
Strong, J. B., West Sutton, Que.	Leicesters.
Sutton, Mark, Ospringe	Leicesters.
Taylor, W. H., London	Leicesters.
Taylor, A. M., Annan	———.
Telfer Bros., Paris	Southdowns.
Tremblay, Achille A., Eboulement, Que.	Leicesters.
Tinning John M., Trenholme, Que.	Leicesters.
Thompson, Wm., Genoa, Que.	Leicesters.
Tolton, Jas., Walkerton	Oxford Downs.
Turcotte, John, St. Norbert d'Arthabaska	Leicesters.
Turnbull, Oliver, Walton	———.
Turner, John A., Calgary, Alta.	Shropshires.
Underhill, Jos., Claremont	Shropshires & Cotswolds.
Vance, Robert, Ida	Cotswolds.
Verdon, Jos., St. Edouard, Que.	Leicesters.
Wallace, Wm. A., Glen Morris	Shropshires.
Weller, A. E., Duncan	Leicesters.
Whitelaw, A. & W., Guelph	Leicesters.
Wright, W. E., Glanworth	Shropshires.
Williams, H. E., Knowlton, Que.	Shropshires.
Wilson, J. Lockie, Toronto	———.
Wightman, Robert, Clifford	Leicesters.
Willis, Ralph, Newmarket	Cotswolds.
Wise, Ed. H., Clinton	Leicesters.
Wood, Wm., Palermo	Leicesters.
Wood, C. E., Freeman	Leicesters.
Woolnough, J. B., Port Dover	Cotswolds.
Young, John, Abingdon	———.

MEMBERS OF DOMINION SWINE BREEDERS' ASSOCIATION FOR 1906 AND 1907.

Name and Address.	Breed.
Adamson, W. R., Moosomin, Sask.	Yorkshires.
Adamson Bros., Gladstone, Man.	Yorkshires.
Allin, Fred. T., Hampton	Yorkshires.
Aitcheson, Wm., Lambton Mills	Yorkshires.
Allison, David, Roland, Man.	Berkshires.
Alton, Jas., Belfast	Yorkshires.
Alton, Jas. W., Sidney, Man.	Yorkshires.
Aldons, R. B., Lortie, Sask.	Yorkshires.
Bradley, J. T., Gilbert Plains, Man.	Yorkshires.
Badley, Ed., Pense, Sask.	Berkshires.
Barr, Daniel, Jr., Renfrew	Yorkshires.
Baker, Jas. E., Barronfield, N.S.	Duroc Jerseys.
Banford, Wm., Chilliwack, B.C.	Tamworths.
Bradley, A. J., Milverton	Berkshires.
Brandon, C. W., Walsingham Centre	Tamworths.
Brandon, J. L., Walsingham Centre	Yorkshires.
Banting, T. E. M., Banting, Man.	Tamworths.
Balsdon, J. I., Markham	Berkshires.
Bailey, Jas., Sardis, B.C.	Poland Chinas.
Baird, R. & A. H., Chesterfield	Yorkshires.
Beingessner, F. L., Mildmay	Berkshires.
Brethour, J. E., Burford	Yorkshires.
Benson, Stephen, Neepawa, Man.	Yorkshires.
Bredt, P. M., Regina, Sask.	Yorkshires.
Beaman, Herman, Napinka, Man.	Yorkshires.
Bell, J. T., Amber	Tamworths.
Berger, S. G., Langeburg, Sask.	Berkshires.
Bennie, Robert, Vicars, Que.	Berkshires.
Beauchemin, Rev. J. B., St. Luc, Que.	Yorkshires.
Beaudoin, Leandre, St. Alexandre, Que.	Yorkshires.
Bennett, Geo., Charing Cross	Chester Whites.
Beauregard, Horace, St. Damase, Que.	Chester Whites.
Betzner, Geo. T., Copetown	Yorkshires.
Bell, J. F., Leamington	Berkshires.

Name and Address.	Breed.
Belton, Thos. H., Hagersville	Yorkshires & Berkshires.
Beaudet, Ernest, Lotbiniere, Que.	Yorkshires.
Birch, R., Anderson	Yorkshires.
Brien & Son, E., Ridgetown	Berkshires.
Bryson, Jos., Brysonville, Que.	Tamworths.
Britton, Robert, Mulock	Yorkshires.
Blight, Emerson, Millwood, Man.	Berkshires.
Bryan, Geo., Lindsay	Berkshires.
Braid, Wm., Oak River, Man.	Berkshires.
Bright, John, Myrtle Station	Berkshires.
Brown, F. W., Portage La Prairie, Man.	Berkshires.
Boyes, J., Churchill	Berkshires.
Boyes, Enoch, Spirling, Man.	Yorkshires.
Brooks, J. D., Plum Coulee, Man.	Poland Chinas.
Boynton, P. W., Dollar	Berkshires.
Bonnycastle, Chas. E., Campbellford	Berkshires.
Brown, Fred. A., Manitou, Man.	Yorkshires.
Browne Bros., Ellisboro, Sask.	Berkshires.
Bothwell, R., Ottawa	Tamworths.
Bowman, T. E., Berlin	Berkshires.
Boisvert, S., St. Gabriel de Brandon, Que.	Yorkshires.
Boyd, C., Russell	Chester Whites.
Bouin, P., St. Emile Jct., Que.	Yorkshires.
Brownridge, Wm., Ashgrove	Yorkshires.
Brodeur, Philias, Ste. Cesaire, Que.	Berkshires.
Brosseau, E. C., Brosseau Station, Que.	Chester Whites.
Boutet, Joseph, Victoriaville, Que.	Chester Whites.
Boucher, J. T., Dog Pound, Alta.	Yorkshires.
Browne, Mrs. Walter, Killarney, Man.	Yorkshires.
Bowman, T. E., High River, Alta.	Berkshires.
Boyle, J. W., Woodstock	Berkshires.
Burkholder, Noah, Cherrywood	Berkshires.
Bulstrade, C. G., South Qu'Appelle, Sask.	Berkshires.
Burgess, Jas. H., Bothwell	Berkshires.
Cavan, Geo., Box 1052 Toronto	Berkshires.
Campbell, Geo., Killarney, Man.	Tamworths.
Campbell, R. J., Havergal	Berkshires.
Clark, J. G., Ottawa	Yorkshires.
Clark, H. G., Norval	Berkshires.
Craig, Samuel C., Carsonby	Yorkshires.
Chapman, F. M., Audley	Yorkshires.
Caruthers, W. T., Fenella	Yorkshires.
Campbell, D., Boissevain, Man.	Berkshires.
Campbell, John R., Vernon	Yorkshires.
Clarke, Robert, 41 Cooper Street, Ottawa	Chester Whites.
Clark, T. W., Christie, N.B.	Chester Whites.
Clark, W. W., Napinka, Man.	Berkshires.
Campbell, John, Vankleek Hill	Yorkshires.
Carter, J. G., Greenock	Yorkshires.
Clark, J. L., Norval	Berkshires.
Campbell, D. W., Holly Park	Berkshires.
Campbell, Mac., Harwich	Duroc Jerseys.
Carswell, E., Penhold, Alta.	Yorkshires.
Creighton, J. C., Hawley	Tamworths.
Central Experimental Farm, Ottawa	Yorkshires.
Cerswell, J. A., Bond Head	Yorkshires.
Christie, D. J., Killarney, Man.	Tamworths.
Christie, Arthur, Winchester	Chester Whites.
Colwell Bros., Newcastle	Tamworths.
Cowan, J. S., Donegal	Berkshires.
Cowieson, J. B., Queensville	Berkshires.
Cottrelle, G. R., Milton	Berkshires.
Cole, T. J., Bowmanville	Yorkshires.
Cornish, A. E., Broadview, Sask.	Yorkshires.
Crowe, J. W., Gilbert Plains, Man.	Chester Whites.
Cousins, John & Son, Harriston	Yorkshires.
Collins, P. O., Bowesville	Yorkshires.
Connolly, Alf., Danville, Que.	Yorkshires.
Corcoran, E. P., Warden, Que.	Berkshires.
Couture, Jos., Lorette, Co. Quebec, Que.	Yorkshires.
Crowell, W. N., Napinka, Man.	Berkshires.
Corning, H. W., Chegoggin, N.S.	Chester Whites.
Cotè, Philippé, Ste. Pie de Bagot, Que.	Chester Whites.
Crockett, Geo., York, P.E.I	Yorkshires.
Cole, R. H., Wooler	Yorkshires.
College de Saint Laurent, St. Laurent, Que.	———.
Cote, Hylas, St. Hugues, Co. Bagot, Que.	Tamworths.
College de L'Assomption, L'Assomption, Que.	Yorkshires.
Court, Leonard, Donaldson, P.E.I.	Chester Whites.
Cook & Son, B., Oshawa	Yorkshires.
Cote, F. P., St. Valerin de Milton, Que.	Tamworths.
Currie, C., Morriston	Tamworths.
Curtis, A. E., Stanstead, Que.	Chester Whites.
Curry, Hugh, Lacombe, Alta.	Berkshires.
Cumberland, Barlow, Port Hope	Yorkshires.
Couston, Broet & Cie, Peribonca, Que.	Yorkshires.

Curry, Wm., South Qu'Appelle, Sask.	Berkshires.
Curtis, E. H., Alix, Alta.	Yorkshires.
Cross, John, Bond Head	Berkshires.
Chateauvert, Victor, Quebec	Yorkshires.
Davis, H. J., Woodstock	Yorkshires.
Davies, Robert, Todmorden	Yorkshires.
Davidson, Herbert, Mount Nemo	Yorkshires.
Dalton, John, Victoria Harbor	Chester Whites.
Davidson, Thos., Spring Valley	Tamworths.
DeCourcey, D., Bornholm	Yorkshires and C. W.
Denison, W. S., Denison's Mills, Que.	Chester Whites.
Delaney, Thos., Quebec, Que	Yorkshires.
Denis, Arsene, St. Norbert, Que	Yorkshires.
Derbyshire, C. J., Wheatley	Duroc Jerseys.
Department of Agriculture, Edmonton, Alta.	Yorkshires.
Dryden, John, Toronto	Yorkshires.
Dickson, Jas., Orono	Tamworths.
Dillon, Jas., Ellisville	Berkshires.
Douglas, A. R., Franklin, Man.	Berkshires.
Donaldson, Jas., Dewittville, Que.	Chester Whites.
Dolson, Samuel, Alloa	Berkshires.
Douglas & Son, D., Mitchell	Tamworths.
Dolson, H. A., Alloa	Berkshires.
Douglas, Robert M., Tantallon, Sask.	Berkshires.
Dollar, E. H., Heuvelton, N.Y.	Chester Whites.
Dubois, Albert, Chambly Basin, Que.	Yorkshires.
Duthie, Jas., Hartney, Man.	Berkshires.
Dunbar, J., St. Marys	Berkshires.
Durham, W. H., Box 1052 Toronto	Berkshires.
Duck & Son, R. F., Port Credit	Yorkshires.
Dunn, J. A., Wooler	Berkshires.
Dufort, Louis, St. Marc, Que.	Berkshires.
Dugre, J. O., Pointe-du-Lac, Que.	Yorkshires.
Durham, Jno. V., Vanessa	Berkshires.
Ezard, John E., Cooksville	Yorkshires.
Edwards, A. V., Souris, Man.	Berkshires.
Ewens, Jas. M., Minnedosa, Man.	Berkshires.
Ellenton & Son, Jno., Lavender	Yorkshires.
Edgerly, Johnston, Aylmer, Que.	Yorkshires.
Ewens, J. M., Bethany	Berkshires.
Elliott, Dr. J. H., Miami, Man.	Berkshires.
English, W. H., Harding, Man.	Berkshires.
English, Wm., & Geo. E., Petrolia	Yorkshires.
Elliott Bros., Wawanessa, Man.	Yorkshires.
Ellis Bros., Dubuc, Sask.	Berkshires.
Elliott, Robert, Brysonville	Chester Whites.
Esdon, Jas. H., Bainsville	Berkshires.
Elliott, Wm., Galt	Tamworths.
Emond, Jos., St. Francois, d'Orleans, Que.	Yorkshires.
Ecole de Agriculture, d'Oka, Que.	Yorkshires.
Fraser, Thos., Fairfax, Man.	Yorkshires.
Flatt, D. C., & Sons, Millgrove	Yorkshires.
Flack, S., Asker, Alta.	Yorkshires.
Farlinger, J. A., Cornwall	Yorkshires.
Fadden, Lester, Sutton, Que.	Berkshires.
Fraser, Wm., Riviere du Loup, Que.	Chester Whites.
Fletcher, G. D., Binkham	Berkshires.
Featherston, Jos., & Son, Streetsville	Yorkshires.
Ferguson, Jas., Dalmeny	Yorkshires.
Fretz, J. H., Tintern	Tamworths.
Field, W. H. & J. O., Vanessa	Berkshires.
Fisher, Hon. Sydney, Ottawa	Tamworths.
Frisby, R. S., Victoria Square	Yorkshires.
Forrester, Geo., Moorewood	Chester Whites.
Foley, J. A., St. Thuribe, Que.	Yorkshires.
Fuller, F. L., Truro, N.S.	Yorkshires.
Foisy, C. A., L'Epiphanie, Que.	Berkshires.
Graham, A., Pomeroy, Man.	Yorkshires.
Garbutt, R. J., Belleville	Yorkshires.
Graham, J. N., Udora	Yorkshires.
Galloway, W. B., Fingerboard	Berkshires.
Glazier, D. V., Manhard	Yorkshires.
Garceau, Gideon, Point-du-lac, Que.	Yorkshires.
Gamble, Robert, Swan Lake, Man.	Yorkshires.
Greenwood, Thos., Douglas, Man.	Berkshires.
German, Herbert, St. George	Tamworths.
Gillespie, W., Roblin, Man.	Yorkshires.
Greenway, Thos., Crystal City, Man.	Yorkshires.
Glen Bros., Didsbury, Alta.	Yorkshires.
Glenhodson Co., Myrtle	Yorkshires.
Glendinning, H. V., Harding, Man.	Yorkshires.
Greenshields, J. N., Danville, Que.	Yorkshires.
Grigg, T. G., Salford	Berkshires.
Green, Geo., Fairview	Berkshires.
Geoffroy, C. E., St. Elie d'Oxford, Que.	Yorkshires.
Gingras, Alfred, St. Cesaire, Que.	Chester Whites.
Gibson, D. J., Newcastle	Tamworths.
Grisdale Bros., Graham, Que.	Yorkshires.

Name and Address.	Breed.
Grimme, Washington, Pender Island, B.C.	Berkshires.
Gingras, Geo. E., Knowlton, Que.	Tamworths.
Girard, Nap., South Durham, Que.	Chester Whites.
Goodliffe, S. J., Sussex, N.B.	Yorkshires.
Grove, J. L., Ringwood	Yorkshires.
Gordon, C. A. R., Shelbrook, Sask.	Yorkshires.
Goodfellow Bros., Macville	Yorkshires.
Goucher, Alvi, St. Damase, Que.	Chester Whites.
Gosselin, F. X., Ste. Famille, d'Orleans, Que.	Yorkshires.
Goodall, Arch. J., Bathgate, N.D., U.S.A.	Berkshires.
Goodfellow, Jno., Myrehall	Berkshires.
Gorden, Norman, Ellisboro, Sask.	———.
Gunn & Son, D., Beaverton	Yorkshires.
Guerin, Leon, Coaticook, Que.	Yorkshires.
Hauser, Ignatius, Weisenburg	Yorkshires.
Hamilton, Jas., Shakespeare	Berkshires.
Hawkinson, L. D., Grovesend	Yorkshires.
Hardy, Wellington, Roland, Man.	Yorkshires.
Hall, W. A., Stanbridge, E., Que.	Tamworths.
Harris, R. N., Gatineau Pt., Que.	Yorkshires.
Harding, R. H., Thorndale	Chester Whites.
Haldon Bros., Turgoose, B.C.	Tamworths.
Hamilton, Wm., Carnduff, Sask.	Berkshires.
Hagle, S. G., Violet	Yorkshires.
Harrow Bros., Emo	Yorkshires.
Hamilton, Geo., Neepawa, Man.	Yorkshires.
Hawkins, W., & Son, Alliston	Tamworths.
Haley, L. B., Rawdonville, Alta.	Tamworths.
Hastings Bros., Cross Hill	———.
Hallman, A. C., Breslau	Tamworths.
Hatch, E. A., Staffordville	Yorkshires.
Heslop, Arthur, Appleby	Yorkshires.
Henders, R. C., Culross, Man.	Berkshires.
Hyde, Geo. A., Shakespeare	Yorkshires.
Haining, Samuel, Highgate	Berkshires.
Hyslop, Robert, Brantford	Berkshires.
Hillier Bros., Albuna	Chester Whites.
Hillhouse, A. P., Bondville, Que.	Yorkshires & Tamworths.
Hooey, L., Powle's Corners	Yorkshires.
Holden, B. F., Indian Head, Sask.	Berkshires.
Howe, Wm., North Bruce	Berkshires.
Hood, G. B., Guelph	Yorkshires.
Howlett, Ira L., Keldon	Yorkshires.
Hoskin, Bertram, The Gully	Tamworths.
Hopkins, Dr. A. G., Neepawa, Man.	Yorkshires.
Honey, R., Brickley	Yorkshires.
Horn, Peter, Regina, Sask.	Yorkshires.
Hodgson, S. P., Swan Lake, Man.	Yorkshires.
Howard, Wm. A., Box 74 Wetaskawin, Alta.	Berkshires.
Houston, R., Dixie	———.
Hurley, J. M., Belleville	Yorkshires.
Hubbard & Simpson, Poplar Point, Man.	Berkshires.
Hurdman, W. B., Hurdman's Bridge	———.
Hunter, J. A., Holly Park	Berkshires.
Hunt, C. W., Indian Head, Sask.	Yorkshires.
Hume & Co., Alex., Menie	Yorkshires.
Humphries, Jas., Bobcaygeon	Berkshires.
Hughes, Samuel, Grandview, Man.	Yorkshires.
Hulet, A. E., Norwich	Yorkshires.
Hurley & Son, Belleville	Yorkshires.
Ings, A. P., Pownall, P.E.I.	Berkshires.
Irving, Geo., Point aux Trembles, Que.	Yorkshires.
Ibbotson, A. R., Beresford, Man.	Yorkshires.
James, Walter, & Son, Rosser, Man.	Yorkshires.
Jackson, R., Alma	Yorkshires.
Jackman, W. J., East Clover Bar, Alta.	Berkshires.
James, Clarence M., Rosser, Man.	Yorkshires.
Jeffs, E., & Son, Bond Head	Berkshires.
Jewett, Jno. R., Macinquac, N.B.	Chester Whites.
Jones, Wm., Zenda	Yorkshires.
Johnson Bros., Underwood	Yorkshires.
Jones, D., Caledonia	Yorkshires.
Kay, W. F., Philipsburg, Que.	Yorkshires.
Kerbyson, J. R., Fairfax, Man.	Yorkshires.
Kent, W. C., Moose Jaw, Sask.	Tamworths.
Kelly, John, & Son, Shakespeare	Berkshires.
Kean & Son, J., Orillia	Yorkshires.
Kelly Bros., Hagersville	Yorkshires.
King, P. & G., Oakwood	Yorkshires.
King, Oliver, Wawanessa, Man.	Yorkshires.
Killough, J. A., Pense, Sask.	Yorkshires.
Koelln, H., Glen Allan	Yorkshires & Berkshires.
Lawrence, J., Oxford Centre	Berkshires.
Lahmer, John, Vine	Berkshires.
Laidler, Jas., Neepawa, Man.	Berkshires.
Langelier, Gus. A., Cap Rouge, Que.	Yorkshires.

Lavelle, Paul, Berthier en Haut, Que.	Yorkshires.
Lalanne, Pierre, Mont Johnston, Que.	Chester Whites.
Lafontaine, J. E., St. Hughes, Que	Yorkshires.
Laporte, J. O., St. Jean, Que.	Yorkshires.
Lang & Son, J., Burketon	Berkshires.
Lefaivre, P. M., Vankleek Hill	Berkshires.
Lemon, S., Kettleby	Berkshires.
Lee, Jas., & Son, Durham, Que.	Berkshires.
Lee, J. W., & Son, Simcoe	Yorkshires.
Leggat, John, & Son, Durham, Que.	Yorkshires.
Legge, A., Minto, N.D., U.S.A.	Berkshires.
Lee, Richard, Bridge Creek, Man.	Berkshires.
Legris, Ulderis, St. Leon, Que	Yorkshires.
Leclerc, Jos., Ste. Charles de Bellechasse	Yorkshires.
Lebrun, Adolphe, Belle Riviere, Que.	Yorkshires.
Lemaire, Joseph, St. Majorique, Que.	Yorkshires.
Lebel, Polydore, St. Octave-de-Metes, Que	Yorkshires.
Leclerc, Gregoire, Lorette, Co. Que., Que	Chester Whites.
Lavasseur, Nap., Ste. Angele, de Nicolet	Yorkshires.
Letourneau, E., Ste. Famille, d'Orleans	Yorkshires.
Linton, Wm., Aurora	Yorkshires.
Lichty, John B., Nithburg	Yorkshires.
Little, T., Kirkwall	Yorkshires.
Lloyd, Jas. H., St. Lin, Que.	Yorkshires.
Lowden, M. L., Binbrook	Berkshires.
Lortie, Eugene, Mastai, Que.	Yorkshires.
Martin, R. G., Marysville	Yorkshires.
Martin, W. H., & Son, Warden, Que.	Berkshires.
Mason, H., Scarboro	Berkshires.
Mark, G. H., Oakwood	Berkshires.
Macauley, T. B., Hudson Heights, Que	Berkshires.
Madget, Geo., Highfield	Berkshires.
Martin, W. A., Gilead	Berkshires.
Martin, E. E., Canning	Berkshires.
Maybee, Arnold, Miami, Man.	Yorkshires.
Maton, Walter, Rosebury, Man.	Berkshires.
Malcolm, H. A., Innisfail, Alta.	Yorkshires.
Marcil, Alexis, St. Jean, Que.	Yorkshires.
Maynard, H. T., Chilliwack, B.C.	Duroc Jerseys.
Matchell, Alex., Treherne, Man.	Berkshires.
Mabon, W., Neelin, Man.	Yorkshires.
Macdonald, D. B., North Bedeque, P.E.I.	Berkshires.
Marjerison, Wm., Apple Hill	Berkshires.
Meredith, J. E., Tupperville	Poland Chinas.
Miltimore, E. F., Knowlton, Que.	Tamworths.
Midd, Stephen, Auburn	Berkshires.
Miller, H. J., Lorenz	Yorkshires.
Morrow, R. O., Hilton	Tamworths.
Morgan, E. L., Milliken	Berkshires.
Morrison, A. & J., Homewood, Man.	Berkshires.
Mousseau, J. B., Berthier, Que.	Yorkshires.
Mortson, W. H., Brandon, Man.	Yorkshires.
Moore, Chas., Scotch Lake, N.B.	Chester Whites.
Moody, Matthias, Terrebonne, Que.	Yorkshires
Morkin, J. P., St. Albert, Alta.	Berkshires.
Moodie, R., Guelph	Berkshires.
Mookenberg, D., Markerville, Alta.	Yorkshires.
Muma, G. B., Ayr	Yorkshires.
Murdock, Wm., Palmerston	Yorkshires.
Marcotte, Armand, St. Basile Station, Que.	Yorkshires.
McKay, W., Underwood	Berkshires.
McNally, W. J., Elmwood	Berkshires.
McAvoy, C. C., Atha	Berkshires.
McKay, J. F., Park Hill	Yorkshires.
McCammus, T. W., Bailieboro	Yorkshires.
McGrath, P., Oak Bluff, Man.	Poland Chinas.
McLaughlin, Mrs. O. A., Knowlton, Que	Yorkshires.
MacPhail, Jno. M., Virden, Man.	Berkshires.
McCallum, Thos. H., Spirling, Man.	Berkshires.
McPhail, Robert A., New Haven	Berkshires.
McLeod, John, Milton West	Berkshires.
McEwen, Jas., Kertch	Berkshires.
McBeath, Alex. A., Marshfield, P.E.I.	Yorkshires.
McNeil, R. J., Tatehurst, Que.	Berkshires.
McLennon, H. J., Walters' Falls	Yorkshires.
McGhee, Wm., Jr., Beachville	Berkshires.
McKellar, John M., Box 10, Belmont	Tamworths.
McDiarmid, H. S., Fingal	Yorkshires.
McGillivray, J. A., Bedford Park	————.
McIntosh, C. W., Lacomb, Alta.	Yorkshires.
McNish, W. H. & A. H., Lyn	Tamworths.
McKinnon, D. C., Atherly	Yorkshires.
McGill, J. A., Neepawa, Man.	Berkshires.
McColl, J. B., Cobourg	Berkshires.
McConnell, W. H., Aylmer	Yorkshires.
McDonald, Peter, Virden, Man.	Berkshires.
McDonell, D. C., Grenfell, Sask.	Berkshires.
McRorie, J. A., Landar, Man.	Berkshires.

Name and Address.	Breed.
McDonald Bros., Woodstock	Berkshires.
McDonald, A. D., Napinka, Man.	Berkshires.
Naumas, Jas., Fisherville	Berkshires.
Newson, A., Peepabun	Yorkshires.
Nelles, Alex., & Son, Boston	Tamworths.
Nichol, Robert, Brussels	Yorkshires.
Noble, Johnston, Leamington	Berkshires.
Oswald, W. A., Petit Brule, Que.	Berkshires.
Ostrander, L., Redickville	Berkshires.
Owens, Hon. Wm., Monte Bello, Que.	Yorkshires.
O'Donnell, Thos., Gad's Hill	Berkshires.
Ouim, H., Edensville, Alta.	Poland Chinas.
Ouimet, Clovis, St. Francois de Salles, Que.	Yorkshires.
Plaunt, X., Northcote	Berkshires.
Parlee, M. H., Sussex, N.B.	Yorkshires.
Paisley, S. W., Blackfords, Alta.	Berkshires.
Phaneuf, Antoine, St. Antoine, Que.	Chester Whites.
Papin, L. P., Vancluse, Que.	Yorkshires.
Paul, John G., Moosomin, Sask.	Berkshires.
Paquet, Theodule, St. Nicholas, Que.	Yorkshires.
Parkin, H. & G., Oxford Centre	Berkshires.
Page, J. A., Tyrconnell	Berkshires.
Pearson, S. J., & Son, Meadowvale	Berkshires.
Pelletier, L. C., Montreal, Que.	Chester Whites.
Pettit, W. G., & Son, Freeman	Yorkshires.
Pritchard, R. J., Roland, Man.	Berkshires.
Pritchard, D., Holmesfield, Man.	Berkshires.
Pound, L. L., & Co., Glen Colin	Berkshires.
Potter, A. B., Montgomery, Sask.	Yorkshires.
Pope, J. C., Regina, Sask.	Yorkshires.
Potter, W. A., Moscow	Berkshires.
Proulx, Ludger, St. Camille, Que.	Chester Whites.
Porter Bros., Appleby	Berkshires.
Quinn, J. M., Carleton Place	Yorkshires.
Quintail, Soter, St. Pie, Que.	Tamworths.
Quinton, Ephrem, Mont. Johnston, Que.	Yorkshires.
Quebec, H. M., Clover Bar, Alta.	Tamworths.
Raines, Hunter, Saintfield	————.
Rainie, A. E., St. Camille, Que.	Chester Whites.
Ratte, Joseph, St. Augustin, Que.	Yorkshires.
Ratz, A. E., Tavistock	Yorkshires.
Reid & Co., R., Hintonburg	Tamworths & Berkshires.
Reid, **Jas.**, **Glen William**	Yorkshires.
Reid, Isaac, Ardtrea	Berkshires.
Riley, Jas. J., Jr., Graham, Que.	Yorkshires.
Richardson, J. A., South March	Tamworths.
Rich, W. P., Clark	Berkshires.
Rickert, C. B., Mannheim	Berkshires.
Rye, Jas., Duagh, Alta.	Tamworths.
Richardson, Fred., Columbus	Yorkshires.
Roth, Jacob, Haysville	Yorkshires.
Rodger, Wm. J., Geneva, Que.	Yorkshires.
Rogers, C. F., Woodstock, N.B.	Yorkshires.
Rodrique, Philias, Ste. Francois Beauce	Yorkshires.
Robb, M. T., Huntingdon, Que.	Yorkshires.
Roberge, J. P., St. Pierre, d'Orleans, Que.	Yorkshires.
Robinson, W. T., Goodwood	Yorkshires & Berkshires.
Rusnell, D. H., Stouffville	Berkshires.
Rudd, C. C., Eden Mills	Berkshires.
Russell, Jas. A., Precious Corners	Yorkshires.
Stancomb, Jas., Cartwright, Man.	Yorkshires.
Shannon Bros., Cloverdale, B.C.	Berkshires.
Straub, Adam, Elmira	Yorkshires.
Shaw, D., Bagot, Man.	Berkshires.
Stark, Jas., Ashgrove	Yorkshires.
Standish, John E., Rougemont, Que.	Chester Whites.
Scaman, F. C., Strathcona, Alta.	Tamworths.
Shaw, Neil, Hannah, N. Dak.	Berkshires.
Slater, S. D., 193 Sparks St., Ottawa	Tamworths.
Snaith, Robert, Brandon, Man.	Yorkshires.
Strachan, Jno., Crandall, Man.	Yorkshires.
Startz, John, Kenilworth	Berkshires.
Shanks Bros., Pettepiece, Man.	Berkshires.
Semple, J. R., Brule, N.S.	Yorkshires.
Shepherdson, W. J., Walter's Falls	Berkshires.
Seabrook, P. B., Komoka	Yorkshires.
Snell & Lyons, Norval	Berkshires.
Stewart, Jas. J., Gladstone, Man.	Yorkshires.
Semple, Hugh, Hereward	Yorkshires.
Spencer, W. H., Morpeth	Berkshires.
Seward, J., Harlem	Yorkshires.
Sheriff, Wm., & G. G., Clarence	Chester Whites.
Stevens, A. J., Bedford, Que.	Chester Whites, Tamworths and Berkshires.
Stevens, John M., Bedford, Que.	Tamworths and C. W.
Snell, J. H., Hagersville	Yorkshires.

Stewart, A., Almonte	Yorkshires.
Smith, G. M., Haysville	Yorkshires.
Smith, A. W., Maple Lodge	Yorkshires.
Smith, Wm., Columbus	Poland Chinas.
Siprell & Carroll, Carholm	Berkshires.
Swift Bros., Clover Bar, Alta	Berkshires.
Srigley, John & Son, Allandale	Berkshires.
Smith, W. M., Scotland	Poland Chinas.
Sylvester, L. P., St. Théodore d'Acton, Que.	Yorkshires.
Smith, A. M., Dugald, Man.	Berkshires.
Sinclair, J. Peter, Brocksden	Yorkshires.
Silverthorn, John, Scotland	Chester Whites.
Snowden, Samuel, Bowmanville	Berkshires.
Snowden Bros., Bayfield	Berkshires.
Stockton, H. M., Redgrave	Yorkshires.
Shore, A. L., Roland, Man.	Berkshires.
Scott, Robert, Souris, Man.	Yorkshires.
Stock, C. J., Tavistock	Yorkshires.
Strong, Wm. C., North Sutton, Que.	Berkshires.
Scott, Walter K., Sheho, Sask.	Yorkshires.
Stone, E. A., Knowlton, Que.	Chester Whites.
Shoup, J. B., Brandon, Man.	Yorkshires.
Stone Stock Co., The F. W., Guelph	Berkshires.
Stuart, H., Burford	Yorkshires.
Tran, W. H., Cedar Grove	Yorkshires.
Trann, W. L., Crystal City, Man.	Tamworths.
Taylor, Robert, Goodwood	Yorkshires.
Taylor, John, Rockwood	Yorkshires.
Trappists, Peres, Mistassini, Que	Yorkshires.
Taylor, Wm. H., Fleming, Sask.	Berkshires.
Tran, Geo. J., Cedar Grove	Yorkshires.
Teasdale, Thos., Concord	Berkshires.
Tibbits, Geo., Cowansville, Que.	Tamworths.
Thompson, J., Sardis, B.C.	Chester Whites.
Todd, J. W., Corinth	Berkshires.
Thompson, Irwin, Salmondale, N.B.	Yorkshires.
Thompson, Douglas, Woodstock	Berkshires.
Tomalty, Arthur, Mt. Maple, Que.	Yorkshires.
Thomson, J. C., Mildmay	Yorkshires.
Thompson, W. T., Grenfell, Sask.	Berkshires.
Thomson, C. L., Three Hills, Alta.	Tamworths.
Thompson Bros., Swarthmore, Sask.	Yorkshires.
Thomson, Adam, Shakespeare	Berkshires.
Thurston, R. E., Bobcaygeon	Yorkshires.
Trudel, Théophile, St. Prosper, Que.	Yorkshires.
Thuell, Wm. C., Brussels	Berkshires.
Thouin, Louis, Repentigny, Que.	Yorkshires.
Vasey, H. M., Ladner, B.C.	Yorkshires.
Vance, Robert, Ida	Berkshires.
Van Horne, Sir Wm., Montreal, Que.	Yorkshires.
Vance, A. D., Prescott	Yorkshires.
Verrall, G. W., 61 York St., Toronto	Yorkshires.
Vokes, Chas., Quill Lake, Sask.	Yorkshires.
Waddell, D., Sperling, Man.	Berkshires.
Wade, W. N. & Sons, Ninga, Man.	Yorkshires.
Walker, W., Stevenson, B.C.	Yorkshires.
Watson, Chris., Prosperity, Sask.	Yorkshires.
Wallace, Wm. A., Kars	Berkshires.
Watt & Son, John, Salem	Berkshires.
Walker, M. E., Glencoe	Chester Whites.
Walsh Bros., Babcock Hill, N.Y.	Yorkshires.
Webb, Horatio, Sardis, B.C.	Yorkshires.
Wetherall, F. S., Cookshire, Que.	Poland Chinas.
Weightman, M. C., Menteith, Man.	Yorkshires.
Webster, A. R., Langley Prairie, B.C.	Berkshires.
Westney Bros., Audley	Yorkshires.
Weir & Son, J., Paris	Berkshires.
Wilson, J. J., Milton	Berkshires.
Wilson, Wm., Brampton	Berkshires.
Wymer, C. C., Waterford	Berkshires.
Wigg, Wm., Lewisville, Alta.	Berkshires.
White, Jas., O'Sullivan Corners	Yorkshires.
Wiggens, Henry, Nottawa	Yorkshires.
Wilson, Clarence C., Hawkstone	Yorkshires.
Willitt, Geo., Gore Bay	Berkshires.
Wiley, Nelson, Wisbeach	Yorkshires.
Wintle, Gilbert S., Richmond, Que.	Chester Whites.
Wightman, Geo., Lancaster	Yorkshires.
Wilson, John, Calvin	Yorkshires.
Wylie Bros., Cardinal	Yorkshires.
Wright, Wm., Oakdale	Chester Whites.
Wright, W. E., Glanworth	Chester Whites.
Wilson & Son, J., Fergus	Yorkshires.
Woodward, F., Fernhill	Yorkshires.
Younger, R., Keyes, Man.	Berkshires.
Young, Walt., Minto, Man.	———.
Yuill, A. R., Carleton Place	Berkshires.

MEMBERS OF THE WESTERN ONTARIO POULTRY ASSOCIATION AND VARIETIES ENTERED WINTER FAIR, 1906.

Name and Address.	*Variety.*
Andrewes, F. A., 161 Oxford St. W., London	White Plymouth Rocks.
Aird, P. E., Montreal Annex, Que.	Buff Orpingtons, Black Orpingtons, Orpingtons, A.O.C., Black Red Games, Barred Plymouth Rocks, Ducks.
Armstrong, A. A., Fergus	Barred Plymouth Rocks.
Armstrong, W. W., Queenston	Buff Orpingtons
Arthur, James, 731 Lorne Ave., London	Silver-laced Wyandottes.
Bell, Fred, 400 Crawford St., Toronto	Pigeons.
Barton, A. W., 124 Beaconsfield Ave., Toronto	Pigeons.
Barber, W., 242 Queen St. W., Toronto	Black Red, Brown Red, Duckwing and Birchen Games, Brown Red, Duckwing and Pyle Game Bantams.
Brierly, Geo., Guelph	White Wyandottes.
Bower, Thos., Wingham	Pyle Game Bantams.
Butler, Walter H., 691 York St., London	Black Red Games.
Baldwin, L. H., Deer Park	White Wyandottes.
Bulloch, W. J., Gananoque	White Wyandottes.
Bartlett and Brown, Colborne	Light Brahmas, Barred Plymouth Rocks, Buff Wyandottes, Fowls, A.O.V., G. Sebright Bantams.
Barker, R. K., 23 Scott St., Toronto	Pigeons.
Barnes, Robert, 41 Colborne St., Toronto	Buff Orpingtons.
Boultbee, Alfred, 27 Isabella St., Toronto	Buff Orpingtons.
Bogue, J. & G., Strathroy	Black Wyandottes, Dominiques, Black Javas, A.O.C., Javas, Black Spanish, Redcaps, Polands, Houdans, Creve Cœurs, LaFleche, Sultans, Ducks, Dressed Poultry.
Bertram and Bowslaugh, Vinemount	G. Sebright Bantams.
Brady, Moses, Thorold	Barred Plymouth Rocks, White Wyandottes.
Bradley, John, Milton	S.C. Brown Leghorns.
Bedford and Coulter, 25 Hunter St., Toronto	White Wyandottes.
Baker Bros., Guelph	Turkeys, Geese, Ducks.
Brown, Wm., Owen Sound	Minorcas.
Beattie, H., 314 Dundas St., London	Silver Bearded Polands.
Benson, J. W., Midland	Black Red Game, White Polands, Pigeons.
Brown, G. B., Listowel	Plymouth Rocks, Leghorns.
Baptie, James, Springville	Wyandottes, Hamburgs.
Bell, W. J., Angus	Leghorns, Turkeys.
Boyce, J. R., Box 412, London	Plymouth Rocks, Rhode Island Reds, Bantams.
Bennett, Geo. A. & Sons, Carlisle	Ducks.
Bell, A. E., Port Dover	R.C. Black Minorcas.
Briggs, F. M., 572 Adelaide St., London	Bantams.
Burgess, John, Chelsea Green	Langshans, Wyandottes.
Balfour, James R., Morrisburg	Plymouth Rocks, Barred.
Brill, L. A., 737 Princess Ave., London	Bantams.
Brock, C. W. P., Waterford	Plymouth Rocks, Minorcas.
Bell, Guy, Brampton	Plymouth Rocks, Wyandottes.
Beattie, W. H., Wilton Grove	Turkeys.
Burn, M. T. & Son, Tillsonburg	Dominiques, Games, Polands, Geese, Ducks, Minorcas, Game Bantams.
Blyth, Colin M., Marden	Buff Orpingtons, Embden Geese.
Bogue, Allan, Woodbank	Dorkings, Houdans, Polands, Ducks, Cochins.
Berner, Fred, 1218 Dufferin St., Toronto	White Plymouth Rocks.
Book, Ralph, Woodstock	Andalusians, Black Orpingtons.
Becker, H. F., Waterloo	S. C. Brown Leghorns.
Clark, W. F., 183 Emerald St., Hamilton	Leghorns.
Colwell, Miss Mary, Paris	Turkeys, Geese, Ducks.
Carroll, J. A., St. James Park, London	Plymouth Rocks, Wyandottes, Games, Bantams.
Cadman, Wm., St. Thomas	Leghorns, Hamburgs, Bantams.
Collins, Wm., Union	Turkeys, Ducks.
Carbert, G. B., Campbellville	Wyandottes, Dominiques, Orpingtons.
Chant, Russell H., Lakefield	Black Leghorns.
Clark, J. W., Cainsville	Buff Orpingtons.
Cosh, H. Y., Bobcaygeon	Andalusians.
Coates, Dr. R. C., Thamesville	S. C. White Leghorns.
Cornwall, Nate K., Thamesville	Buff Leghorns.
Cosh, Newton, Port Dover	Barred Plymouth Rocks.
Coulter, Dan., St. Thomas	Barred Plymouth Rocks.

MEMBERS OF THE WESTERN ONTARIO POULTRY ASSOCIATION AND VARIETIES ENTERED WINTER FAIR, 1906.—*Continued.*

Name and Address.	*Variety.*
Conley, T. J., St. Marys	R. C. Brown Leghorns.
Case, Miss Bona E. R., Seaforth	White Wyandottes.
Charlton, Verey, Ilderton	Houdans.
Cameron, John, Brantford	Light Brahmas.
Crowe, Charles R., Guelph	Game Bantams.
Crowe, John, Guelph	Bantams.
Degroff, George, Napanee	Wyandottes, Orpingtons, Houdans.
Dundas, James, Deer Park	Buff Leghorns.
Donovan, H. B., 14 Bank St., Toronto	Silkies, Bantams, Game Bantams.
Daly & Dill, Seaforth	Plymouth Rocks, Wyandottes.
Devitt, A., Berlin	White Wyandottes.
Donaghy, A. E., Colborne	Plymouth Rocks, Bantams.
Daniel, Wm., Plattsville	Wyandottes, Buff Orpingtons.
Dinner, R., St. Thomas	Black Wyandottes.
Doan, A. E., Watford	Games, Leghorns.
Dickie, Robert T., 395 Oxford St., London	Bantams.
Davidson, Miss Elsie, Collingwood	Leghorns, Ducks.
Doidge & McNeil, 706 Colborne St., London,	Wyandottes, Bantams, Game Bantams.
Durst, John C., Benmiller	Leghorns.
Daniels, C. J., 196 River St, Toronto	Wyandottes, Games, Orpingtons, Red Caps, Silkies.
Daley, P. & Son, Seaforth	Wyandottes.
Dawson, Wm., Niagara-on-the-Lake	Wyandottes, Orpingtons, Ducks.
Dunne, Henry, 1492 Queen St. W., Toronto,	S. C. Black Minorcas.
Emrick, Hy., Bridgeburg	Cochins.
Edsall, J. H., Bowmanville	Leghorns, Spanish.
Engel, A. J., Waterloo	Leghorns.
Elliot, Geo., Welland	Wyandottes.
Furminger, S. D., St. Catharines	Game, Bantams, Ducks.
Flawn, Alfred, 130 Horton St., London	Wyandottes.
Fraleigh, E., St. Marys	Wyandottes, Orpingtons.
Fairley, W. H., Guelph	Minorcas, Bantams.
Faulds, T. A., 11 Victor St., London	Minorcas.
Farley, James, St. Thomas	Barred Plymouth Rocks, Bantams.
Fraleigh, Howard, Forest	Wyandottes, Bantams.
Farrell, P. J., Woodstock	Games.
Foster, Joseph, Brampton	Plymouth Rocks.
Finn, Thos., 30 Mellville Ave., Toronto	Games, Leghorns.
Flowers, Hirman, Freelton	Buff Plymouth Rocks.
Fox, William, 597 King St. W., Toronto	Cavies, Rabbits.
Ferguson, William, Brantford	S. C. White Leghorns.
Graham, R. & I., Guelph	Bantams.
Glenn, Alfred, Chatham	Pigeons.
Graham, A. W., St. Thomas	Wyandottes, Leghorns.
Garland & Gilchrist, Hintonburg	Wyandottes.
George, A. J., 52 Clarence St., London	Cochins.
Grier, Percy L., Owen Sound	Leghorns.
Gallinger, F. H., Southend	Plymouth Rocks.
Greystone Farm, Winona	Wyandottes.
Grieve, G. Wilson, Parkhill	Wyandottes.
Graham, Rev. A., Parkhill	Leghorns.
Guild, L. R,, Rockwood	White Wyandottes.
Garthorne, A., Byron	Partridge Wyandottes.
Gurney, W. A., 841 Lorne Ave., London	Leghorns.
Goldie, Roswell, Guelph	Dorkings, Bantams, Ducks, Pheasants.
Graves, A. H., Inwood	S. C. Black Minorcas.
Gould, Peter, Guelph	Plymouth Rocks, Polands,
Gould, Chas., Woodgreen	Turkeys.
Glanville, H.J. & Son, Wharncliffe Rd, London	Cochins, Wyandottes.
Hart & Grimoldby, Owen Sound	Pyle Game Bantams.
Hall, William, Napanee	White Wyandottes.
Hamilton, Jas. R., 29 Orchard St., London	Orpingtons, Black.
Hughes, J. A., "Court House," London	Rhode Island Reds, A. O. V. Rabbits.
Howard, W., Guelph	Wyandottes, Game Bantams, G. Sebright Bantams.
Harron, J. A., Crosshill	Buff Plymouth Rocks, Buff Leghorns.
Hiller, Fred, Berlin	Pigeons.
Harper, J. A., Waterloo	A. O. V. Fowls, Bantams.
Hockin, Chas., London	Barred Plymouth Rocks.
Hurd, H. J., Berlin	Minorcas, Orpingtons.

MEMBERS OF THE WESTERN ONTARIO POULTRY ASSOCIATION AND VARIETIES ENTERED WINTER FAIR, 1906.—*Continued.*

Name and Address.	*Variety.*
Hartnell, M., Hintonburg	Minorcas.
Howard, George, Guelph	Andalusians.
Holmhurst Poultry Yards, Whitby	Buff Cochins.
Hodgkin, F. W., Guelph	Black Leghorns, Canaries, English Goldfinch.
Holden, John E., Woodstock	Leghorns, Minorcas.
Henry, Robert, Guelph	Pigeons.
Hoover, M. R., Locust Hill	R. C. White Leghorns.
Hatton, J. A., 780 Dundas St., London	Pyle Game Bantams, Pigeons.
Hastings Bros.. Crosshill	White Turkeys.
Houston, Richard, Dixie	Cayuga Ducks.
Hoggarth, Wm. E., Hensall	Plymouth Rocks, Leghorns.
Hoffman, H. A., Ridgetown	Orpingtons.
Hellyer, A. W. E., Ottawa South	Buff Orpingtons.
Hiawatha Pigeon Lofts, 635 St. Patrick St. Ottawa,	Pigeons
Harrison, Joseph, Mimico	Rhode Island Reds, Minoracs.
Henderson, G. G., Hamilton	Leghorns.
Hill, John H., Collingwood	S. C. White Leghorns.
Heard, R., 837 Lovett St., London	Black Orpingtons.
Irwin, George W., Seaforth	Brahmas, Cochins, Plymouth Rocks.
Irwin, Jos. A., 30 Bruce St., London	White Wyandottes, Leghorns.
James, W. J., St. Thomas	Black Red Games.
Jones, H. G.. Woodstock	A. O. V. Fowls.
Jay, Herbert C., Strathroy	R. C. White Leghorns.
Jefferies, E., 244 Bain Ave., Toronto	Buff Leghorns.
Jones, Wm. A., 142 Tecumseth St., Toronto,	Pigeons.
Krouse, O. S., 114 Strachan St. E., Hamilton,	Black Hamburgs.
Kirkland, Gordon, Teeswater	White Wyandottes.
Kiley, T. J., London	Bantams.
King, Fred D., Aylmer	Black Sumatra Games, S. C. White Leghorns, Black Hamburgs.
Klager, T. E., Hespeler	Rhode Island Reds.
Knight, Isaac T., Guelph	Andalusions, Ducks.
Kemp & Waterman, Tambling Cor., London,	Black Orpingtons.
Krouse, F. W., Box 587, Guelph	Plymouth Rocks, Wyandottes, Javas, Leghorns, Orpingtons, Hamburgs, Bantams.
Littleproud, A. W., Inwood	White Plymouth Rocks.
Leslie, J. K., Owen Sound	Barred Plymouth Rocks, Pyle Game Bantams.
Lemon, Wilber, Lynden	Wyandottes.
Lawless, Thos., London	Barred Plymouth Rocks.
Liszt, Herman, 71 Tisdale St., Hamilton	Hamburgs.
Liddon Bros., Inwood	Games.
Luxton, A. G. H., Milton West	Dominiques, Turkeys, Ducks, Geese.
LaRose, Chas., Cornwall	Games, Andalusians.
Logan, James J., Morrisburg	Plymouth Rocks, Orpingtons.
Laborn, Rev. Chas. C., Neustadt	S. C. White Leghorns.
Lawrie, R. J., Maple	Cochins, Plymouth Rocks, Wyandottes, Dominiques, Games, Leghorns, Spanish, Houdans, A.OV. Fowls, Geese, Ducks, Pigeons.
Luscombe, John, Merton	Rhode Island Reds.
Mihm, Wm. J., Guelph	Rhode Island Reds, Games.
Mitchell & McGrogan, Guelph	Buff Cochins, Pigeons, Rabbits.
Moebus, W. & Son, Summerhill Ave., Toronto,	Buff Wyandottes.
Mosley, Harry, Owen Sound	Buff Orpington.
Morley, Earle, Milton	Black Red Games.
Millard, I. K., Dundas	Barred Plymouth Rocks.
Magill, J. H., Port Hope	G. L. Wyandottes, Pigeons.
Meates, S. G., Brantford	Buff Orpingtons.
Middlemiss, Robt. C., Brantford	Columbian Wyandottes.
Martin, John S., Port Dover	White Wyandottes.
Minshall J. H., Brantford	Minorcas.
Massie, Chas., Port Hope	White Wyandottes.
Macpherson, John, 72 Elmwood Ave., London,	Wyandottes.
Mullock Bros., Waterdown	Pekin Ducks.
Marr, Dr. D., Ridgetown	Plymouth Rocks, Orpingtons.
Murray, W. G., Strathroy	Cochins, Bantams.
Moyer, A, C., Waterloo	White Minorcas.
Murdie, R. G., Seaforth	Turkeys.
Murray & Son, Brockville	Black Orpingtons.

MEMBERS OF THE WESTERN ONTARIO POULTRY ASSOCIATION AND VARIETIES ENTERED WINTER FAIR, 1906.— *Continued.*

Name and Address.	*Variety.*
Milne, Geo. J., Oshawa	Buff Orpingtons.
Meikle, Geo. D., Morrisburg	Barred Plymouth Rocks.
Monahan, Wm., South London	Partridge Wyandottes.
Meiselbach, Harry, C., Melrose Park, Ill	White Minorcas.
Morton, G., Carluke	Barred Plymouth Rocks.
Monroe, Geo. E., Forest	White Plymouth Rocks.
McNiven, F. W. S., Guelph	White Plymouth Rocks.
McMaster, W. A., Guelph	Rhode Island Reds, Games A.O.S.V., S.C. Black Minorcas.
McDougall, A., & Son, Milton	Silver Grey Dorkings, Turkeys, Geese.
McInnis, G. A., Prescott	S.C. Black Minorcas.
McKellar, Donald, Hawkesbury	S.C. White Leghorns.
McKinstry, R. E., 68 1st Ave., Ottawa	Pyle Game Bantams, Pigeons.
McIntosh, G. E., Forest	Light Brahmas.
McCormack, J. L., Brantford	S.C. White Leghorns.
McMullen, Thos. F., London	Buff Orpingtons.
McNeil, Wm., 778 Waterloo St., London	Polands, A.O.V. Fowls.
McDonnell, Frank P., Watford	Wyandottes, Minorcas.
McCurdy, R., 176 Oxford St., London	Black Langshans.
McMullen, John, 822 York St., London	Buff Wyandottes.
McMurray, Thos., North Bay	G.P. Hamburgs.
McKee, Harry, Norwich	Silver Grey Dorkings.
McGlennon, Wallace, Colborne	Silver Grey Dorkings.
McCormack, James M., Rockton	Dorkings, Geese, Ducks.
Niven, J. S., 423 Colborne St., London	Buff Orpingtons.
Neate, M. C., 33 Sussex St., Ottawa	Barred Plymouth Rocks.
Nickason, John, Guelph	Buff Orpingtons.
Nantel, W. B., St. Jerome, Que., Co. Terrebonne	Brahmas, Cochins, Games, Polands, Bantams.
Orr, Edward E., Brantford	S.C. Brown Leghorns.
Oke, Richard, Box 361, London	Cochins, Wyandottes, Javas, Leghorns, Creve Coeurs, LaFleche, Hamburgs, Sultans, Bantams.
Ottawa Poultry Yards, Ottawa	Rhode Island Reds.
Osborne, W. M., Brockville	Blk. Leghorns, White Minorcas.
Pranschke, W. C., 36 Centre St., Ottawa	Columbian Wyandottes.
Player, W. J., Galt	S.C. Brown Leghorns.
Poole, Geo., Guelph	S. Sebright Bantams.
Paul, J. J., Sebringville	Buff Orpingtons.
Philpot, Jas., & Son, Guelph	Langshans, A.O.C. Rhode Island Reds, Games, Pyle Game Bantams.
Pearson Wm. H., Guelph	Game Bantans.
Pringle, John, 187 Waverley Rd., London	Barred Plymouth Rocks.
Palmer, E. B., Norwich	Silver Grey Dorkings.
Parkin, F. & G., Oxford Centre	A.O.V. Geese.
Packham & Allison, Brampton	Wyandottes.
Plastow, Samuel J., Rockton	Partridge Cochins.
Prangley, G. B., Dawn Mills	S.C. White Leghorns.
Parkinson, John, Dorchester	Pyle Games.
Peer, Gideon, Guelph	White Wyandottes.
Pond, R. H,, Woodstock	Buff Orpingtons.
Pickering, E. A., Willowdale	White Wyandottes
Pritchard, Dr. J., North Wakefield	Indian Games.
Reid, W. H., 35 Union St., Kingston	Javas, Games, Leghorns, Hamburgs, Bantams, Pigeons, Orpingtons, Houdans.
Roberts, W. J., East Hamilton	Orpingtons, A.O.C.
Rawnsley, Harold, Weston	Bantams.
Ruby, H. S., & Son, Midland	Spanish, Houdans, S.S. Hamburgs.
Robertson, Geo. A., St. Catherines	White Plymouth Rocks.
Raymo, Walton E., Waterloo	A.O.V. Fowls, Bantams.
Robertson, George, Box 242, Ottawa	White Plymouth Rocks.
Rook Bros., Prescott	Blk. Leghorns, Red Caps, Game Bantams.
Revere Poultry Yards, The, Mt. Carmel, Conn.	S.C. Brown Leghorns.
Roberts, John W., St. Thomas	Black Red Games.
Ridler, L., Guelph	Brown Red Game Bantams, Pigeons, Rabbits.
Rawlings, E. A., Forest	Black Orpingtons.
Readwin, A. & T., Guelph	Wyandottes, Leghorns, Minorcas, Pigeons.
Ross, Harry A., Guelph	White Wyandottes.
Richardson, Charles, Gourock	Andalusians.
Rosser, Harold H., 60 Close Ave., Toronto	Buff Cochin Bantams.

MEMBERS OF THE WESTERN ONTARIO POULTRY ASSOCIATION AND VARIETIES ENTERED WINTER FAIR, 1906.—*Concluded.*

Name and Address.	*Variety.*
Sherlock, Tom, 945 Lorne Ave., London	Pyle Games.
Sheridan, T. J., Oshawa	Black Leghorns.
Syer, E., Milton	S.C. White Leghorns.
Smith & Browne, Columbus	Barred Plymouth Rocks, Indian Games, Houdans.
Simpson, W. Percy, Centralia	White Wyandottes.
Sheward, Bert, Guelph	Pigeons.
Stroh, M. H., Waterloo	Black Orpingtons.
Stagg, Frank, Box 870, St. Catherines	Buff Leghorns.
Samuel, I. Hughes, Norway	Buff Wyandottes.
Stevenson Bros., Woodstock	Bantams.
Saunders, Teddie, 447 St. James St., London,	Silkies.
Shea, Thos. M., Fergus	Geese, Ducks.
Smith, L., Leamington	Buff Plymouth Rocks, Partridge Wyandottes.
Sanderson, Jacob C., St. Thomas	Buff Wyandottes, Buff Orpingtons.
Scott, T. H., St. Thomas	Wyandottes, Ducks.
Spiers Bros., Guelph	Game Bantams, Duckwings, Buff Cochin Bantams.
Sage, L. C., 420 South St., London	Brahmas, Wyandottes.
Shaw, John M., Forest	White Plymouth Rocks.
Smiley, S. H., St. Thomas	Rhode Island Reds.
Snyder, Elias, Burgessville	Barred Plymouth Rocks.
Stewardson, W. R., Lucan	Pigeons.
Smith, W. M., Scotland	Geese, Ducks.
Simpson, W. W., Guelph	Bantams.
Slessor, W. J., 520 Adelaide St., London	Bantams.
Schelter, C., Fonthill	White Plymouth Rocks, White Wyandottes, A.O. V. Fowls.
Scanlan Bros., Ennotville	Barred Plymouth Rocks, Geese, Ducks.
Scott, R. M., 225 Brock Ave., Toronto	Pigeons.
Smith, Joe R., Strathroy	Black Wyandottes.
Spry & Mick, 142 Dundas St., Toronto	Buff Wyandottes.
Streib, J., Inwood	S.C. Brown Leghorns.
Schlaback, M. J., Petersburg	A.O.V. Fowls.
Telfer Bros., Milton	Games, White Turkeys.
Tilt, C. A. R., Doon	Dark Brahmas, Black Langshans, Blk. Minorcas, Bantams, Geese, Ducks.
Teale, Wm. J., Guelph	A.O.C. Langshans, Games, A.O.V. Fowls, Bantams, Ducks, Pigeons.
Thomson, Douglas, Woodstock	Silver Grey Dorkings.
Tozer, H. R. K., Richmond St., London	Brahmas, Cochins, Leghorns, Bantams.
Trebilcock, A. H., 889 Lorne Ave., London,	Games.
Topping & Finchamp, Woodbank	Indian Games, any variety.
Thorpe, J. M., 41 Briscoe St., London	A.O.V. Fowls.
Tyson & McMaster, Guelph	Game Bantams.
Ubelacker, F., Stratford	Light Brahmas.
Vance, Geo., Woodstock	Buff Wyandottes, Pyle Game.
Vernor, Earl, Stratford	Pigeons.
Wyatt, Hugh, London	Buff Cochins.
Westbury, Frank, 920 Elias St., London	Plymouth Rocks.
Wrag Bros., London	Wyandottes.
Wright, John H., Oakville	Black Langshans.
White, Geo. J., 163 Main St. E., Hamilton	Pigeons.
Worth, Wm., St. Thomas	R.C. Black Minorcas.
Wankel, Emil, Waterloo	Black Wyandottes, Rhode Island Reds.
Wheadon, R. L., Guelph	White Wyandottes, S.C. Blk. Minorcas.
Worthy, Joseph A., 58 Smith St., Toronto	Pigeons.
Wreith, Alex., Lucan	Cochins, Minorcas, Hamburgs.
Wardell, Thos., Woodstock	S.C. White Leghorns.
Warrington, J. H., Cornwall	Dorkings, Polands, Red Caps, Cayuga Ducks.
Willis, F. L., Seaforth	White Plymouth Rocks.
Wells, E., Jr., 22 Hamilton Rd., London	Red Caps.
Wright, W. E., Glamworth	Red Caps, Turkeys.
Woodward, F. A., 2 Churchill Ave., Toronto,	Cochin Partridge Bantams, Pigeons.
Westbrook, James H., 781 King St., London,	Brahmas, Bantams
Wallace, H. H., 594 Talbot St., London	Plymouth Rocks, Wyandottes, Aylesbury Ducks.
Wilson, Wm., Guelph	White Wyandottes.
Wilson, Wm. C. & Sons, Hawkestone	Brahmas, Cochins, Leghorns, Hamburgs, Houdans Bantams.
Wales, F., Milton	Rhode Island Reds, Leghorns, Andalusians, Ducks.
Warrington, Henry, 233 Dufferin Ave., Tor.	Minorcas.

MEMBERS OF THE EASTERN ONTARIO POULTRY ASSOCIATION AND VARIETIES ENTERED AT THE EASTERN ONTARIO LIVE STOCK AND POULTRY SHOW, 1907.

Name and Address.	*Variety.*
Annand, W. J., 28 Metcalf Sq., Ottawa	White Orpingtons.
Arnold, W., 305 Laurier Ave. E., Ottawa	White Wyandottes.
Andrews, F. A., London	White Plymouth Rocks.
Armstrong, J. L., 102 Bank St., Ottawa	Black Orpingtons.
Benjamin, E. H., 108 Besserer St., Ottawa	Old English or Pit Game, Rouen Ducks.
Benson, J. A., Billing's Bridge	White Minorcas, S.C. White Leghorns,
Bellvue Poultry Yards, Contrecoeur, Que	A.O.S.V. Fowls, Pigeons.
Brill, L. A., 737 Princess Ave., London	Sebright and Cochin Bantams, Japanese.
Burgess, J., Chelsea Green	Langshans.
Bogart, F. C., Napanee	White Orpingtons.
Briggs, F. M., 572 Adelaide St., London	Cochin Bantams.
Beckstead, F. W., Morrisburg	Barred Plymouth Rocks.
Bradley, Geo., Carsonby	Bronze Turkeys.
Bogue, G. & J., Strathroy	Wyandottes, Javas, Game, Spanish, Dorkings, Houdans, Creve Coeurs, Polands, Ducks, La Fleche, Red Caps, A.O.S.V. Fowls.
Brown, G. E., Point Fortune, Que	Brahmas, Games, Minorcas, Hamburgs, Polands, Bantams.
Binning, R. C., Outremont, Que	White Orpingtons.
Belford, J. A., 22 Creighton St., Ottawa	Light Brahmas.
Byshe, Herbert, 166 Bank St., Ottawa	White Leghorns.
Bertie, J. E., St, Jerome, Que	White Wyandottes.
Craig, G. E., 489 Gladstone Ave., Ottawa	White Plymouth Rocks.
Christmann, L. O., Beachburg	White Orpingtons.
Collins, G. H. A., 102 Colborne St., Ottawa	S.C. Brown Leghorns.
Cornish, C. C., 359 Somerset St., Ottawa	Light Brahmas.
Capital Pigeon Lofts, 158 Nelson St., Ottawa	Pigeons.
Crouch, Thomas S., Billing's Bridge	Buff Wyandottes, S.C. White Leghorns, Hares.
Charleton, W. H., 110 Stanley Ave., Ottawa	Buff Wyandottes, S. C. White Leghorns.
Chant, Rev. J. H., Newburgh	Golden Wyandottes, Buff Orpingtons.
Charbonneau, W. L., 456 Besserer St., Ottawa	Pigeons.
Clark, J. W., Cainsville	Buff Orpingtons.
Carswell, E. A., Grafton	Wyandottes, Leghorns, Andalusians, Hamburgs, Bantams.
Craig & Snetsinger, Cornwall	W. Wyandottes, B. Javas, Bronze Turkeys, Ducks.
Cumming, D., Russell	Plymouth Rocks, Game, Leghorns, Turkeys, Ducks, Hamburgs, Geese.
Delary, Wm., 187 Pretoria Ave., Ottawa	Silver Wyandottes.
Daniels, C. J., 196 River St., Toronto	Wyandottes, Game, Orpingtons, Red Caps.
Dynes, Alex., Hintonburg	Plymouth Rocks, Wyandottes, Ducks.
Doidge & McNeil, 706 Colborne St., London	White Wyandottes, Bantams.
Ellis, Wm., Prescott	Black Minorcas.
Fidler, J. E., Brockville	Buff Plymouth Rocks, Partridge Wyandottes.
Fallis, R., Ottawa South	White Wyandottes.
Frith, E. R., Maxville	Wyandottes, Rhode Island Reds, Minorcas, Pigeons.
Fulford, Henry, Manhard	Plymouth Rocks, Wyandottes, Leghorns, Orpingtons.
Gill, J. I., 173 Friel St., Ottawa	S. C. White Leghorns, Pigeons.
Garland and Gilchrist, Hintonburg	Orpingtons, Buff Rocks.
Grant, John, Rockland	Buff Orpingtons.
Hawley, Geo., Prescott	G. Sebright Bantams.
Hellyer, A.W. E., Belmont Ave., Ottawa	Buff Orpingtons.
Higman, Geo., 61 Sussex St., Ottawa	White Wyandottes, Faverolls.
James, F. A., 153 Centre St., Ottawa	Barred Plymouth Rocks.
Lambertus, John A., Eganville	Barred Plymouth Rocks.
Lake, G., 155 Russell Ave., Ottawa	White Wyandottes.
Lafortune, J. A., 261 St. Patrick St., Ottawa	Rhode Island Reds.
Logan, Jas. J., Box 50, Morrisburg	White Orpingtons.
Luxton, A. G. H., Milton West	Games, Black Leghorns, Silver Gray Dorkings, Pigeons, Ducks and Geese, Hares, Doves.
Matheson, G. M., 69 Russell Ave., Ottawa	Partridge Wyandottes.
Montgomery, W. L., Gravel Hill	Geese.
Murray & Son, Brockville	Orpingtons.
Murray, W. G., Strathroy	Cochins, Bantams.
McKinstry, R. E., 68 1st Ave., Glebe, Ottawa	Pyle Game Bantans, Pigeons.

MEMBERS OF THE EASTERN ONTARIO POULTRY ASSOCIATION AND VARIETIES ENTERED AT THE EASTERN ONTARIO LIVE STOCK AND POULTRY SHOW, 1907.—*Concluded.*

Name and Address.	*Variety.*
McKellar, Donald, Hawkesbury	S. C. White Leghorns.
McCurdy, R., 176 Oxford St., London	Langshans.
McCorkill, M. H., Billings Bridge	Buff Cochin Bantams.
McInnis, G. A., Prescott	Black Minorcas, Bantams.
McDougall & Voat, Fairfield East	White Wyandottes, Buff Orpingtons.
McNeil, Wm., 778 Waterloo St., London	Polands, A. O. S. V.
Neate, M C., 33 Sussex St., Ottawa	Barred Plymouth Rocks.
Nantel, W. B, St. Jerome, Co. Terrebonne, Que.	Brahmas, Cochins, Faverolles, Polands, Bantams.
Ottawa Poultry Yards, Ottawa	Plymouth Rocks, Rhode Island Reds, Black Minorcas.
Osborne, W. M., Brockville	S. C. Black Leghorns, White Minorcas.
Oke, Richard, Box 361, London	Cochins, Javas, Houdans, Creve Coeurs, Hamburgs, A. O. S. V., Fowls, Bantams, Leghorns, La Fleche.
Peaker, J. M., 75 McKay St., Ottawa	Black Minorcas.
Peaker, Morley, 75 McKay St., Ottawa	Buff Cochins.
Player, W. J., Galt	S. C. Brown Leghorn.
Pritchard, Dr. J., North Wakevield, Que	Brahmas, C. Indian Game.
Packham, C. J., Brampton	Buff Wyandottes.
Plante & Laderoute, 174 Bank St., Ottawa	S. C. White Leghorns, Faverolles, R. C. Leghorns, Pigeons.
Palen, R., 75 Archibals St., Ottawa	Barred Plymouth Rocks.
Pillar, Chesley, Russell	Barred Plymouth Rocks, Turkeys.
Robertson, Geo., Box 242, Ottawa	White Plymouth Rocks.
Rodier, L. L., 62 St. Martin St., Montreal, Que.	Partridge Wyandottes, Houdans, LaFleche.
Radley, Maurice, Outremont, Montreal, Que.	White Plymouth Rocks.
Reid, W. H , 35 Union St., Kingston	Wyandottes, Javas, Game, Leghorns, Dorkings, Hamburgs, Bantams, Pigeons.
Reid, R. & Co., Hintonburg	Pekin Ducks.
Rook, Bros., Prescott	Game Bantams.
Readwin, A. & T., Guelph	Pigeons.
Snelling, W. H., Rockliffe Park, Ottawa	Orpingtons.
Slessor, W. J., 520 Adelaide St., London	Bantams.
Stoddart, Jas., 135 Stanley Ave., Ottawa	White Wyandottes, White Orpingtons.
Slinn, W. H., 208 Petterson Ave., Ottawa	Orpingtons.
Sterling, A. I., 79 McKay St., Ottawa	White Plymouth Rocks.
Stellie, David, Almonte	White Wyandottes, Hamburgs.
Smith & Brown, Columbus	Houdans.
Stapleford, S., Watford	Games.
Sage, L., London	Dark Brahmas, Partridge Wyandottes.
Taylor, C. M. Lyn	Buff Wyandottes.
Thompson, A., Allan's Corners, Que	White Plymouth Rocks, S. S. Hamburgs, Turkeys, Geese, Ducks.
Tooker & Bowey, Brockville	Cochins, Wyandottes.
Thom, W. E., Morrisburg	Orpingtons.
Treadgold & Trebilcock, London	Games, Game Bantams.
Tozer, H. R. K., London	Light Brahmas, Games, Brown Leghorns, Bantams.
Watson, A. H., Madoc	Barred Plymouth Rocks.
Wait, J. G., Wicklow	S. C. White Leghorns, Buff Orpingtons.
Williams, J. H., Hintonburg	Cochins.
Wilson & Son, Wm. C., Hawkestone	Partridge Cochins, Brown Leghorns, S. P. Hamburgs, Bantams.
Wright Bros., Brockville	White Wyandottes.
Warrington, J. H., Cornwall	White Wyandottes, Spanish, Dorkings, Creve Coeurs, LaFleche, Red Caps, Polands, A. O. S. V. Fowls.
Whitney, L., Hintonburg	Buff Orpingtons.

REPORT

OF THE

Special Investigation

ON

Horse Breeding in Ontario

1906.

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO)

PRINTED BY ORDER OF
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TORONTO.

To the Honorable WILLIAM MORTIMER CLARK, K.C.,
Lieutenant-Governor of Ontario.

MAY IT PLEASE YOUR HONOR:

The undersigned begs to present herewith, for the consideration of Your Honor, the report on the Horse Industry of Ontario, 1906, which has been prepared by the Live Stock Branch of the Ontario Department of Agriculture.

Respectfully submitted,

NELSON MONTEITH,

Minister of Agriculture.

TORONTO, March, 1907.

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Showing number of each breed in Province 135

REPORT OF THE SPECIAL INVESTIGATION

ON

Horse Breeding in Ontario.

INTRODUCTION.

The question of improving the quality of the horses bred in the Province has been considered at different times at annual and others meetings of live stock associations, as well as being a subject of concern to persons individually or officially interested in the promotion of the horse industry. No unanimous and satisfactory scheme calculated to improve conditions could be decided upon, and when the matter was carefully inquired into, it was found that the reason, apparently, was a lack of accurate and detailed information as to the exact conditions throughout the Province which affect the quality of the horses produced. It was therefore decided by the Minister of Agriculture that before undertaking any comprehensive plan for the improvement of horse-breeding, it would be wise to procure more complete information upon which conclusions might be based. It was felt that detailed and accurate information along the following lines should be obtained before any comprehensive policy should be adopted looking to the general improvement of the horse industry in Ontario.

1. What conditions have affected or are affecting the quality and number of stallions and brood mares, in the various sections of the Province, and if the effect is for good, whether or not the same conditions could be applied in other sections; and if the conditions have not a good effect what could be done to remove them.
2. What class of horses can most profitably be raised in different sections of the Province, under the natural conditions found in those sections.
3. The system of syndicating, and any other plan at present adopted in Ontario, other than private ownership.
4. The views of horsemen generally as to the advisability of a Stallion Inspection Act.
5. Suggestions from those interested in the horse business, as to what can be done to improve conditions of the horse business generally.

For the purpose of obtaining this information, the Legislature was asked to make an appropriation, which was done at the session of 1906, and the following plan of work was adopted:—

The counties of the Province were divided into eight districts, and two Inspectors, one to represent light horses, and one to represent heavy horses, were appointed to investigate and report on the conditions in each district. The Inspectors were instructed to inspect each known stallion located in their district, and to obtain from the stallion owner and others with whom they came in contact, such information as might be possible regarding the mares. The information obtained in this way is practically accurate, regarding the stallions, and approximately correct regarding the mares. The Inspectors were instructed to make a report on the stallions covering the following points:

1. Owner.
2. Post office address.
3. Breed or breed most favored.
4. Pure-bred or grade.
5. If pure-bred, imported or Canadian-bred, and registration number and name of Record.
6. Average age.
7. Weight.
8. Sound or unsound.
9. If unsound, what disease.
10. Conformation.
11. Action.
12. Approximate value.
13. Number of mares served.
14. Service fee.
15. Per cent. of foals.
16. If sound, score out of possible 100 points.
17. Remarks.

The following points are covered in the report on the mares:

1. Number in township.
2. Average number kept by each breeder.
3. Type.
4. Average weight.
5. Average quality.
6 Average age.
7. Average value.
8. Remarks.

Information regarding matters of a general nature covered by the investigation were obtained by meeting with those interested in the horse industry in each district, either individually or at the public meeting held in each county for this purpose. It was not the intention that at this meeting, or at any other time, the inspectors should endeavor to direct public opinion to obtain certain results or decisions, nor was the work undertaken with the object of conducting an educational campaign. This latter point might be a natural result of the investigation, and form part of a general plan to be adopted for improving conditions, but it was not a part of the work of the inspectors. What was required was a full and intelligent discussion of the different matters covered by the investigation, and to give every one interested an opportunity to express his opinion as to how the conditions relating to the breeding of horses could best be improved.

In order to facilitate the work of the Inspectors, the Secretary of the Farmers' Institute, in each institute district, was requested to organize the district, obtain the names of the stallion owners in his institute district, arrange the most convenient route for inspecting these stallions in their own stables, and also in order to avoid loss of time to drive with the inspectors throughout the district. The stallion owners were notified by circular letter as to the probable time of the visit of the Inspectors. The local officers also advertised and made the necessary arrangements for holding the public meeting in each county.

The result of the investigation in each institute district depended to a great extent upon the preliminary work being properly done, and the report will show that this work was well done in most cases by the local institute officers.

The list of Inspectors, the districts visited by them, and the counties comprising each district are given below:

DISTRICTS.

District No. 1.—Counties of Middlesex, Essex, Kent, Elgin, and Lambton. Wm. Smith, Columbus; J. D. Graham, Toronto.

District No. 2.—Counties of Halton, Wentworth, Brant, Oxford, Norfolk, Haldimand, Welland, and Lincoln. John Gardhouse, Highfield; Wm. Cain, V.S., Perth.

District No. 3.—Counties of Huron, Bruce and Grey. H. G. Reed, V.S., Georgetown; John Bright, Myrtle.

District No. 4.—Counties of Perth, Waterloo, Wellington, and Dufferin. Wm. Jones, Zenda; Peter Christie, M.P., Manchester; John A. Boag, Ravenshoe.

District No. 5.—Counties of Peel, Simcoe, York, and Ontario. Thos. McMillan, Seaforth; Wm. Mossip, St. Mary's.

District No. 6.—Counties of Hastings, Peterborough, Victoria, Durham, Northumberland and Prince Edward. J. G. Clarke, Ottawa; Jas. Irving, Winchester.

District No. 7.—Counties of Prescott, Russell, Carleton, Renfrew, and Lanark. W. F. Kydd, Simcoe; Geo. Gray, Newcastle.

District No. 8.—Counties of Glengarry, Dundas, Grenville, Leeds, Frontenac, and Lennox and Addington. H. S. Arkell, B.S.A., O.A.C., Guelph; Jas. Sinclair, V.S., Cannington; Arthur Thom, Elma.

NOTE.—Where more than two inspectors are given for one district, the work was divided so that but two inspectors were in the district at one time. The work of inspection in Stormont County was done by George Gray, Newcastle, and A. R. Walsh, V.S., Perth.

The following list shows the place and date at which it was arranged to hold the public meeting for each county.

PUBLIC MEETINGS.

County.	Town or city.	Date.	County.	Town or city.	Date.
Brant	Brantford	Oct. 20.	Lincoln	St. Catharines	Nov. 17.
Bruce	Paisley	" 26.	Middlesex	London	Oct. 19.
Carleton	Stittsville	" 30.	Northumberland	Brighton	Nov. 15.
Durham	Orono	Nov. 9.	Norfolk	Simcoe	" 3.
Dufferin	Shelburne	" 12.	Oxford	Woodstock	Oct. 27.
Dundas	Winchester	Oct. 18.	Ontario	Port Perry	Nov. 13.
Essex	Essex	" 26.	Perth	Mitchell	Oct. 16.
Elgin	St. Thomas	Nov. 9.	Peterborough	Madoc	" 17.
Frontenac	Harrowsmith	" 5.	Prince Edward	Picton	Nov. 20.
Grey	Markdale	" 8.	Peel	Caledon East	Oct. 12.
Grenville	Kemptville	Oct. 25.	Prescott	Vankleek Hill	" 13.
Glengarry	Alexandria	" 13.	Russell	Russell	" 22.
Hastings	Madoc	" 17.	Renfrew	Cobden	Nov. 6.
Huron	Clinton	" 11.	Simcoe	Barrie	Oct. 26.
Halton	Milton	" 11.	Victoria	Lindsay	" 31.
Haldimand	Fisherville	Nov. 8.	Wellington	Fergus	Nov. 7.
Kent	Chatham	" 2.	Waterloo	Berlin	Oct. 22.
Lanark	Carleton Place	" 12.	Wentworth	Dundas	" 16.
Lambton	Petrolea	" 19.	Welland	Welland	Nov. 14.
Leeds	Lansdowne	Oct. 31.	York	Richmond Hill	" 5.
Lennox and Adington	Napanee	Nov. 13.			

It was practically impossible to procure the name of every stallion owner in the Province, and in a very few of the townships it may be found that this may slightly affect the report on that particular township, but it will not affect the report of the county to any appreciable extent. In some few cases also, the owners would not allow their horses to be inspected, and wherever a stallion was not inspected, the report of the mares in the tabulated statement for the township in which such stallion is located will also be affected. It should also be borne in mind that stallions are credited to the townships in which they were located at the time of inspection, when they may possibly travel through the surrounding townships during the season; this may give a somewhat erroneous impression regarding the townships not credited, if this fact is not noted. It should also be specially noted that the number of mares credited to any township in the tabulated statement is the number of mares bred to stallions inspected in that township, and will not necessarily denote the number of breeding mares actually owned in the township. The information regarding the amount of service fees, and the number of mares bred to each stallion was supplied the Inspectors by the owner of the stallion. The Inspectors did not always have an opportunity of verifying this information, and referring specially to the service fees, it has been suggested that the advertised service fee was not always adhered to.

In this report standard-bred horses and pure-bred horses are classed together, the standard-bred horses being termed pure-bred as a matter of convenience in preparing the report. The ame is also true of the term grade being applied to denote non-standard-bred horses of roadster type. Roadster stallions (Canadian-bred) include standard-bred horses bred in Canada and stallions of Roadster type bred in Canada, but registered in Records other than the American Trotting Register. Roadster grade stallions include grade stallions of Roadster type not registered in any record.

The report following is compiled from the statistics and general information supplied by the Inspectors, the report from each district being given separately. The report on each county in the above districts is given by townships, with a summarized table and general information regarding the whole county, given at the end of the county report. The remarks of the Inspectors regarding the work generally are given at the end of the report of the district which was under their charge. The report for each district after being finally prepared was submitted to and approved by the Inspectors for that district. A summarized report and statistics covering the Province, in accordance with the above districts, completes the report of the investigation.

DISTRICT NO. 1.

Counties.—Middlesex, Essex, Kent, Elgin and Lambton.
Inspectors.—Wm. Smith, Columbus, and J. D. Graham, Toronto.

MIDDLESEX.

The township of Biddulph was first gone over. Two Clydesdale stallions, two Shires, a Percheron, a Standard-bred, and a Roadster, were seen by the Inspectors. All of these were registered, and all the Clydesdales, Shires, and the Percheron were imported animals. The Clydesdales were of an excellent type, one weighing 2,100 lbs. and both had been used on a large number of mares. The Roadster was of good conformation and action, while the rest were described as fair. All were sound. It is estimated that there are 1,000 breeding mares in the township, being mostly of Clydesdale and Roadster type, and averaging about 1,350 lbs. in weight. Their average quality is described as fair, and the average age 8 years. Service fees ran from $10 to $15, and in one instance was given as $25.

In McGillivray township, Clydesdales largely predominate; out of the nine stallions seen, five being of that breed, all imported but one. Their quality ranged from good to fair. One aged grade Clydesdale was seen, and one of the three Standard-breds and Roadsters was also a grade. Most of the stallions were sound, two coming under the head of "fairly sound." The average weight of the Clydesdales was about 1,750 lbs., and of the Standard-breds, about 1,050 lbs. Mares of Clydesdale type, averaging 1,200 lbs., are most generally found, and some 723 were bred, being of fair quality, their average age being 7 years. From $8 to $15, are charged as service fees.

In the township of West Williams, there were seen two Clydesdales, a Shire, a Roadster, and an Arabian (the latter a grade), standing for service. The four registered stallions were all sound, the two heaviest, a Clydesdale and a Shire, being reported at 2,000 lbs. Service fees ranged from $8 for the grade to $12 for one of the Clydesdales and the Roadster, the low fee for the grade evidently affecting adversely the average of the fees throughout the township. The Roadster was described as of very good conformation, that of the others ranging from fairly good to fair. The number of brood mares in the township is 500, being of Clydesdale and Roadster type, of fair average quality, and in weight 1,300 lbs. Average age was 6 years.

East Williams has fewer stallions than its sister township, only three being located by the inspectors, and of these, one was a grade. The Clydesdale, an imported horse, scored well, and had been used on a good number of mares. The Hackney was of good conformation and action, and had been used on a large number of mares, of which a very high percentage were in foal. All three stallions were sound. As regards mares, they are of good quality, in number about 600, of Clydesdale and Roadster type, and average in weight 1,250 lbs., and in years, 8. From $10 to $15 are the service fees, the higher fee being for the Hackney.

Two Clydesdales and a Percheron, all sound, and two of them of good conformation, comprised the sires seen in Adelaide township. The average value of the three was $1,200. All three were imported animals. As in the other townships of this county, the mares were mostly of Clydesdale and Roadster type, of good average quality, weighing about 1,200 lbs., in age averaging 8 years, and numbered some 600. $10 to $12 are paid for service fees.

Middlesex—Continued.

Out of the eight stallions in Lobo township (one of which was a grade), four were registered Clydesdales, three being imported. The German Coach stallion seen was of excellent conformation, and had good action, and had proved a successful foal getter. Of the two Roadsters, one was good, the other being undersized, and only fair in conformation. Service fees were from $9 to $15. The average quality of the mares in this township, which average 1,200 lbs. in weight, and are of the Clydesdale and Roadster type, is fair, and average age is 7 years.

Caradoc township makes a good showing in point of numbers of stallions. Out of the thirteen inspected, six were Clydesdales, four Roadsters, one a Percheron, one a Thoroughbred, and one an Arabian. Of these, four were grades or unregistered. A large proportion were out for their first season here, so that no record of their value as sires could be obtained. With one exception all were sound. The mares kept in this township are of the draught and general purpose type, weghing about 1,100 lbs., and are fair in quality, with an average age of 7 years. Service fees are from $8 to $15.

Metcalfe township is fairly well provided with sires, fairly equally divided between light and heavy breeds, the light somewhat preponderating. Three Roadsters, three Clydesdales, and one Coach stallion make up the list. The Clydesdales score highest in conformation and quality, and all are sound or fairly so. Here, again, the majority of the sires had put in their first season, and so no idea of their breeding abilities could be secured. Of those that had been standing for service more than one season, the percentage of foals was fairly good. The stud fees were from $10 to $15. The average weight of mares was no higher than 1,100 lbs.; quality fair, they bein of a light or very slightly Clydesdale type. About 750 is the number of mares kept. Their average age is 8 years.

Mosa is a township with horses of a distinctly light type, hence the sires used are mostly of the lighter order. One Thoroughbred, two Roadsters, a grade Roadster, a German Coach, two Percherons, a Clydesdale, and a Clydesdale grade constitute the list. All but one are reported sound. Here. again, the service fee ranged from $10 to $15, the majority charging the lower fee. The mares in this township are described as partly general purpose, and partly Roadster in type. Their average quality is fair. Their average weight is about 1,100 lbs., and age, 8 years.

Ten to fifteen dollars is also the range of service fees in Ekfrid township, where there are only four stallions, two apiece of Roadsters and of Clydesdales, all sound and, as far as tested, fairly reliable sires. About 600 mares are kept, being of a Roadster type, with some inclined to a general purpose conformation. Their average age is 7 years, and weight, 1,100 lbs.

West Nissouri with its 1,000 mares of Roadster and Clydesdale type, averaging 1,200 lbs. in weight, leans towards the heavy type of sire, no less than 7 out of the 11 visited being Clydesdales, four imported, and three Canadian bred. There is also a Hackney kept for service for the first season, two Roadsters (one a grade) and a French sire. While most of the sires are young, one is 20 years old, and another 11. Most of them are reported sound. The fees are as low as $8, and up to $15. The average age of the mares is 7 years.

In North Dorchester township, while the type of mare is of the general purpose, Roadster and Hackney style, the tendency is to use mostly Clydesdale or Shire stallions, while two Hackneys have also put in their

Middlesex.—Continued.

first season. In addition to these there is a Roadster. All are sound, and the conformation is fairly good, two scoring as very good. In age, the oldest is 11, and the youngest 3 years. Four are newcomers; the percentage of foals for the rest being good. Mares, which are of average quality, number 800. Their average weight is 1,100 lbs., and age 7 years.

The city of London is the headquarters for 12 stallions, being 7 Clydesdales, a Thoroughbred, and four Roadsters, one of these a grade. Six of the Clydesdales were newly imported, and the ages of the twelve ranged from 2 to "aged." All ranked as sound, and the service fee charged varied from $12 to $15, while for three Roadsters the fees are quoted at $20 to $50.

Westminster township excels the average of the surrounding townships, except that of London, in the total number of mares kept, 1,500, also in the average quality which is good. They scale about 1,200 lbs., and are of draught and roadster type, averaging in age 7 years. Of the sires kept, two are registered Clydesdales, and one a grade, and there is one apiece of the Shire, Percheron, and Roadster breed, the latter not being used for service. The oldest horse is 13 years, and all are sound. Service fees are placed at $8 to $15.

London township is the banner one of Middlesex county as regards the number of stallions and mares kept, there being 16 of the former and 2,500 of the latter, which the inspectors describe as mares of good quality, weighing 1,250 lbs., averaging in age about 7 years, and in type partly draught and partly roadster. The conformation of the sires does not seem to be in all cases as good as it might be, although a number scored well. The ages varied from 4 to 15 years. The list includes four Clydesdales, four Shires (two being grades), four Roadsters, two Hackneys and two Percherons. Eight to fifteen dollars are the service fees paid, and in the case of a Roadster stallion a fee of $20 is given.

STALLIONS.

Breeding.	Number.	Average weight. Pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	44	1,743	6	All	Good	3,443	12
Clydesdales, Canadian-bred	7	1,380	5	All	Fair	432	10
Grades, Clydesdale	5	1,580	8	All	Fair	343	9
Shires, Imported	8	1,812	7	All	Fair	547	12
Grades, Shire	2	1,450	9	1	Fair	65	8
Percherons	8	1,744	6	All	Medium fair	921	11
Hackneys, Imported	5	1,350	6	All	Fairly good.	543	13
Standard-breds, Imported	14	1,053	8	All	Good	590	15
Roadsters, Canadian-bred	7	1,000	6	All	Good	358	14
Thoroughbreds, Imported	3	1,184	15	All	Medium good.	152	11
German Coach Horses	2	1,325	12	All	Good	251	13
English Coach Horses	1	1,300	9	All	Fair	50	10
Grades.—Hackney, Roadster, Arabian and French Canadian (1 Hackney, 11 Roadsters, 2 Arabian, 1 French Canadian)	15	1,095	6	All	Fair	704	10
Totals	121					8,399	

Middlesex.—Concluded.

MARES.

Townships.	Number of mares bred to stallions inspected in Township.	Type.	Average weight. Pounds.	Average quality.	Average age.
Biddulph	467	Clydesdale and Roadster	1,350	Fair.	8
McGillivray	723	Clydesdale	1,200	Fair.	7
West Williams	445	Clydesdale and Roadster	1,300	Fair.	6
East Williams	334	Clydesdale and Roadster	1,250	Good	8
Adelaide	311	Clydesdale and Roadster	1,200	Good	8
Lobo	644	Clydesdale and Roadster	1,200	Fair.	7
Caradoc	676	Draught and General Purpose	1,100	Fair.	7
Metcalfe	605	Light and others half light Clydesdale	1,100	Fair.	8
Mosa	668	General Purpose, Clydesdale and some Roadster	1,100	Fair.	8
Ekfrid	185	Roadsters and Grades inclined to General Purpose	1,100	Fair.	7
West Nissouri	606	Roadster and Clydesdale	1,200	Fair.	7
North Dorchester	872	General Purpose, Roadster and Hackney	1,100	Fair.	7
London City	231	Draught and Roadster	1,200	Good	7
Westminster	443				
London	1,189	Draught and Roadster	1,250	Good	7
Total	8,399				

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions	99	7,287	99	7,287	12	....	....	....
Grade Stallions	22	1,112	21	1,087	9	1	25	10
Totals	121	8,399	120	8,374	....	1	25	....

The public meeting for the County of Middlesex was held in London on the 19th of October. Among those present were Col. McEwen, Dr. Fitzgerald, J. Courcey, Dr. Stevenson and Dr. Tennant. All agreed that there should be a license on stallions, and that the owner of a licensed horse should be entitled to a lien on the mare and foal for the amount of the service fee.

Essex.

In the township of Maidstone there are three registered Roadsters and three Clydesdales, one of the latter being a grade. All are sound, but as types of the breeds the Clydesdales have the advantage. One of the Roadsters is a pacer. Excepting the two sires that had been doing their first season, the percentage of foals reported is not high. From $9 to $15 is charged for service fees. Some 800 mares ranging from general purpose to Roadsters, with a few draughts, are kept, but the average quality is only fair; average weight 1,100 lbs.; and average age 9 years.

In Sandwich East township two Roadster stallions and one Percheron were inspected. The 600 mares to be found here are not of high quality, and average 9 years in age. Ten dollars is the service fee.

Sandwich West is on a par with her sister township as regards mares, which are described as poor, of bad type, weighing about 1,050 lbs. and numbering 700, while the average age is 10 years. Two Clydesdale stallions, both imported, are kept. One is an excellent individual; $12 and $16 are the stud fees charged.

Rochester township is distinctly in favor of raising heavy horses and boasts of eleven stallions, four being Clydesdales, three Shires (one a grade), two Percherons and two French Canadians. One Clydesdale and one Percheron are also grades. They are reported as ranging, with one exception, from medium to very good. Fees charged are $7, $8, $10, and $14. Mares range from light type to a few draughts; they number 1,100, and are fair in quality, average weight being 1,100 lbs., and age 8 years.

Six Roadsters, three being pure-bred and three grades, and two Clydesdales in their first season, comprise the sires in Mersea township all being sound, but some not rating high in conformation and quality. There are about 1,000 mares in this district, some draught, some general purpose, and others Roadster. Their average quality is medium, the average weight 1,100 lbs., and average age 8 years. From $10 to $15 is the service fee, while for one Roadster the fee is placed at $25.

The Percheron is the predominant breed in Gosfield South township and this type prevails largely among the mares, the balance being Roadsters. The quality of the mares is only fair, and the average weight 1,100 lbs. and average age 8 years. Of the eight stallions standing for service, 5 are pure-bred Percherons, one a German Coach, and two Roadsters. Of the eight, one is unsound, and the average rating is not high. Stud fees range from $10 to $12.

In Malden township only one stallion was inspected, a pure-bred Percheron, three years old, reported as being a good one. There are 600 mares in this township, of a general purpose type, weighing about 1,100 lbs., but only fair in quality. Their average age is 8 years.

In Gosfield North, too, only one stallion was seen, also a Percheron, 4 year old, that has not yet stood for service. The type of mares here is largely Percheron, scaling about 1,100 lbs., quality being fair. In number they are about 700, their average age is 7 years.

A Hackney, two Clydesdales, a Percheron, a Thoroughbred, and Roadster constitute the stallion stock of Colchester South township. With the exception of one, the standard is not very high, but all are sound, ages running from 6 to 15 years. Ten to fifteen dollars is the run of service fees, mostly at the lower figure. Mares number 700, and are principally light in type, scaling 1,050 lbs. with an average age of 8 years, while their average quality is not high.

Essex—Continued.

Colchester North has a somewhat similiar list of sires, viz., three Clydesdales, a Thoroughbred, a Percheron, and a Roadster, with ages from 4 to 16 years. The standard, too, is not as high as it should be, with one exception. Two of the horses were far advanced in years. The mares seen were fair in quality, averaging 1,150 lbs., and are inclined to the draught type, with some Roadsters and Percherons. In number they are about 800, and their average age is 8 years.

STALLIONS

Breeding.	Number.	Average weight. Pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	4	1,725	5½	All	Fairly good	340	13
Clydesdales, Canadian-bred	8	1,644	8	All	Good.	722	11
Grades, Clydesdale	4	1,425	7½	All	Fair.	301	9
Shires, Imported, and Grades (1 pure-bred, 2 grades)	3	1,760	5½	All	Very fair.	305	11
Percherons, Imported	8	1,650	8	All	Fair	586	12
Percherons, Canadian-bred	2	1,500	3½	All	Good	125	10
Grades, Percheron	2	1,400	6		Fair	100	10
Hackney, Imported	1	1,300	6	All	Excellent		
Standard-breds, Imported, and Roadsters, Canadian-bred, (6 imported, 1 Roadster, Canadian-bred)	7	1,084	10	All	Fair	371	14
Grades, Roadster	8	1,130	6	7	Fair	333	10
Thoroughbreds	2	1,125	10	All	Fair	165	11
German Coach Horses and French Canadian (1 German Coach, 2 French Canadian)	3	1,475	13	All	Pretty good	279	10
Totals	52					3,627	

MARES.

Townships.	Number bred to stallions inspected in Township.	Type.	Average weight. Pounds.	Average quality.	Average age.
Maidstone	345	General purpose and a few draught and roadsters	1,100	Just fair	9
Sandwich East	286	Bad	1,050	Poor	9
Sandwich West	100	Bad	1,050	Poor	10
Rochester	1,042	Some draught and light kinds	1,100	Just fair	8
Mersea	505	Some draught, general purpose and roadsters	1,100	Medium	8
Gosfield South	488	A good many Percherons and some roadsters	1,100	Only fair	8
Malden		General purpose	1,100	Only fair	8
Gosfield North		Mostly Percheron	1,100	Fair	7
Colchester South	320	Mostly light kinds	1,050	Only fair	8
Colchester North	541	Inclined to draught, with some roadsters and Percherons	1,150	Fair	8
Total	3,627				

Essex.—Concluded.

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions..	36	2,728	36	2,728	12	....	....	....
Grade Stallions......	16	899	15	834	9	1	65	12
Totals........	52	3,627	51	3,562	....	1	65	....

The meeting held at Essex was not large, but it was enthusiastic over the future of the horse trade of this Province. The roads were bad, and a number of the breeders who came in by train had to remain all night. The meeting was unanimously in favor of a Licensing Act and also registration. The only point upon which there was any difference was the amount of licensing fee, a fair majority wanting a moderate sum, and the balance going to the extreme.

KENT.

Some sections of Kent County seem to favor heavy horse breeding more than others, but the main type is the lighter breeds. The city of Chatham is a great light horse centre, and of the sires owned by horsemen in this city, ten in number, four are Roadsters, one a Hackney, two Percherons, two Clydes, and one a Shire. The Roadsters are mostly a good class, and also the Hackney, while the two heavy breeds are fairly well represented. Two of the stallions are fifteen years old, and stud fees vary from $10 to $15, while for three Roadsters $20 is the fee stated.

The township of Raleigh inclines somewhat to the heavier breeds, there being two Clydesdales (one a grade), two Shires, a Percheron, and two Roadsters available here. The fee for a Roadster, $30, heads the list, the general run of fees being $10 and $13. All the horses are reported sound, and all have stood to a good number of mares. Of these latter there are in this township about 1,500, weighing about 1,100 lbs., and of fair average quality. They vary in type from Percheron to Roadster and general purpose, and are of an average age of nine years.

Tilbury East is mainly a heavy horse centre, there being five Clydesdales (two grades) and one Coach stallion. The average quality is not as high as it might be, and three of the horses are getting on in years, one being reported as unsound. Stud fees come at $9 to $15. Draught, general purpose, and Roadster are the three prevailing types among the mares in this section, which average in weight 1,200 lbs., and are fair in quality, age averaging seven years.

There are four Roadsters (two of them grades) and one Thoroughbred to a single Clydesdale stallion in Romney township, which indicates fairly well the type of mares kept, which are general purpose, Roadster, and some of heavier type of draught. Two of the stallions are aged, and with but two exceptions did not rank as high as they might. From $10 to $13 are the

Kent—Continued.

general fees charged for service, but for one Roadster the fee is $20. Mares are fair in quality, in weight averaging 1,150 lbs., and in age seven years.

With the exception of one Clydesdale all the stallions in the township of Zone are Roadsters, two of these and the Clydesdale scoring well as regards conformation and action. All are sound but one. Fees range from $10 to $20, Roadsters topping the list, as elsewhere. Mares of general purpose and Roadster type, of about 1,100 lbs. weight and medium quality, constitute the breeding stock of this township. Their average age is 8 years.

Howard township is well represented in the number and variety of sires kept for service, which include two Hackneys, a German Coach, a French horse, two Cleveland Bays, a French Canadian horse, three Roadsters, two Coach horses, and six Clydesdales. Seven of these stallions are grades. They are mostly a good lot and the majority are sound, but two are 14 and 19 years old respectively. Ten to fifteen dollars is the range of fees for service, with one given as $20. In all there are some 1,800 mares of fair quality in the township, of an average weight of 1,200 lbs., about a third being of the draught type, the rest general purpose and Roadsters. Their average age is eight years.

All the six stallions inspected in Camden township were young horses and sound, three of them having been out for their first season. The average quality is fairly high, and the service fees follow the general rule from $10 to $15. There are 1,200 mares in the township, of Clydesdale, general purpose, and Percheron type, whose quality is fair, and average weight about 1,150 lbs., average age being seven years.

Harwich township possesses what is rather a rarity in Ontario now, viz., Suffolk Punch sire. The heavy horse interests are served by two Clydesdales and two Shires, while there are in addition three Percherons, a Coach horse, and three Roadsters. Two of the stallions are grades. The majority are reported sound, but some are well up in years. The service fee is the usual range from $10 to $15. The percentage of mares bred out of the 3,000 in the township is about 35 per cent. They average 1,250 lbs. in weight, and are mostly general purpose, with some draughts and Roadsters. Their average quality is fair, and age seven years.

No stallions appear to be located in Chatham township. There are about 1,000 mares, chiefly of Percheron and light type, weighing on an average 1,100 lbs., and only fair in quality, average age being seven years.

Of the two stallions inspected in Dover township, one is a Percheron, the other a French Canadian, both pure-bred and of fair conformation. The fees are respectively, $15 and $11, and to them were bred rather more than a quarter of the 800 Percheron type of mare found in this township, their average weight being 1,100 lbs., quality only fair, and average age eight years.

Orford township has one Percheron stallion four years old, sound and well rated, and has a good percentage of foals to its credit. There is also a Clydesdale and Coach horse. Service fees are from $8 to $10. About 800 mares are kept by farmers, being mostly of general purpose stamp, with a very few of heavier build. They average about 1,150 lbs., and rate fairly well as to quality, age averaging about eight years.

Kent—Continued.

STALLIONS.

Breeding.	Number.	Average Weight. Pounds.	Average Age.	Serviceably sound.	Average confirmation.	Number of mares served.	Average service fee.
Clydesdales, Imported	6	1,825	7	All	Very fair	404	$ 13
Clydesdales, Canadian-bred	7	1,657	10	6	Fair	565	10
Grades, Clydesdale	6	1,600	6	All	Fairly good	463	10
Shires, Imported	5	1,750	8	All	Fair	399	12
Shires, Canadian-bred	1	1,600	7	All	Very fair	85	10
Grades, Shire	1	1,300	2	All	Medium	9	12
Percherons, Imported	5	1,493	9	All	Very fair	558	14
Percherons, Canadian	3	1,590	6	All	Very fair	335	12
Suffolk, Punch	1	1,700	15	All	Fair	110	12
Hackneys, Imported	2	1,225	7½	All	Good	217	17
Hackneys, Canadian-bred	2	1,000	6	1	Good	14	10
Standard-breds, Imported	12	1,130	8½	10	Good	561	17
Roadsters, Canadian-bred	4	1,020	8	All	Good	60	10
Grades, Roadster	4	1,000	8½	3	Only fair	82	10
Thoroughbreds	1	1,050	13	All	Medium	70	12
Grades, German Coach	4	1,300	10	All	Fair	228	9
Cleveland Bays and Grades (1 pure-bred, 3 grades)	4	1,380	6	All	Very fair	342	10
French Canadian and Grades (2 pure-breds, 1 grade)	3	1,325	15	All	Very fair	314	11
Totals	71					4816	

MARES.

Townships.	Number of mares bred to Stallions inspected in Township.	Type.	Average weight. Pounds.	Average quality.	Average age.
City of Chatham	522	Light Roadster	1,050	Fair	9
Raleigh	525	Percheron, Roadster and General Purpose	1,100	Fair	9
East Tilbury	548	Draught, General Purpose and Roadster	1,200	Fair	7
Romney	310	Strongly General Purpose, Draught and Roadster	1,150	Fair	7
Zone	289	General Purpose and Roadster	1,100	Medium	8
Orford	215	Mostly General Purpose, balance Roadster	1,100	Only fair	9
Howard	1,002	One-third Draught, balance General Purpose and Roadster	1,200	Fair	8
Camden	389	Clydesdales, General Purpose and Percheron	1,150	Fair	7
Harwich	786	Mostly General Purpose, a few Draught and some Roadsters	1,250	Fair	7
Chatham	....	A good many Percherons and light kinds	1,100	Only fair	7
Dover	230	Percherons	1,100	Only fair	8
Total	4,816				

Kent—Concluded.

Mares Bred to Different Classes of Stallions.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions	52	3,673	48	3,469	10	4	204	10
Grade Stallions	19	1,143	18	1,118	10	1	25	10
Totals	71	4,816	66	4,587	....	5	229	....

The public meeting for the county of Kent was held at Chatham on November 2nd. Representatives were present from nearly every part of the county. The meeting was unanimously in favor of an Inspection Act in regard to pedigree and individuality, and also expressed an opinion that syndicating of stallions was all right provided good individuals were purchased at proper prices. It was suggested that more attention be paid to subjects relating to the horse industry at Farmers' Institute meetings, and that Agricultural Societies should provide a separate class for each breed of horses.

Elgin.

Southwold Township has nine stallions, made up as follows: Three Clydesdales, one Shire, a Percheron, two Roadsters (one a grade), a Thoroughbred and a coach horse. All are sound, and rate about the average, with two considerably above. Two were far advanced in years, and of the rest, five had travelled for the first time. Ten to sixteen dollars are the service fees, with one standing at $20. Draught, general purpose, and Roadster are the general types of the mares kept, which have an average weight of 1,200 lbs., an average age of 7 years, and being in quality fair.

Dunwich Township has some 1,200 mares of a heavier type, weighing 1,350 lbs. on the average, about 2 per cent. being lighter in build. Their quality is reported good, and age averages 5 years. The heavier type of mares is responsible for a corresponding increase in the proportion of sires of that stamp kept, which is 5 Clydes, a Percheron, a Hackney, and two Thoroughbreds (one a grade). Two of these horses are aged; the ages of the others range from 2 to 8 years. All pass muster as sound. Three of the horses are newcomers to this district. Fees charged vary from $10 to $17 with one at $20.

Ten stallions are on the routes in Yarmouth Township, where the prevailing type of mares is general purpose and Roadster, with a few draughts. The average weight of mares is 1,100 lbs., average age 8 years, and the number 1,200, their quality being only fair. The sires run pretty much to the lighter types, there being only one Clydesdale to seven Roadsters, a Thoroughbred, and a French Canadian. With two exceptions they are all sound, but some are up in years. $25 are the service fees in two cases for Roadsters, $12 to $15 being the usual fee charged.

Malahide is another township that favors the lighter breeds, the average weight of the mares being not more than 1,000 lbs., and they are of Hackney

Elgin—Continued.

and Roadster type, and in quality fair. Their average age is 8 years. Roadster sires predominate, being five in number, but of these three are grades; Hackneys are four in all, one being a grade; Percherons number two, and Thoroughbreds one. No information could be obtained about one horse which with its owner was away from home. Most are sound, but two were very old. Fees are $10, $11, $13 to $15. The average quality is fair.

The Inspectors' report as to the mare stock in Bayham Township is not at all favorable, the 500 mares there being in quality bad, in type the same, and only averaging 950 lbs. in weight, their average age being 10 years. Roadster stallions number four out of six sires in use, and of these two are grades. There is also one Thoroughbred and a Percheron. Fees are as low as $5, $12 being the maximum sum.

In Aldboro' Township mares are of a somewhat heavier type, the greater number being general purpose, with others of a Clydesdale type. About 1,150 is the average weight, quality being medium. The number kept is about 1,200, the average age being 9 years. Two Clydesdales, two Roadsters, a Hackney and a French Canadian (two being grades) form the total of the sires kept. With one exception they are sound. One is well on in years. Conformation and action of four are good. As low as $7 is charged for fees, but the maximum is $15.

STALLIONS.

Breeding.	Number.	Average weight. Pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	10	1,740	6	All	Good	847	14
Clydesdales, Canadian-bred	3	1,550	7	All	Fair	354	10
Shires, Imported	1	1,900	5	All	Fair	110	15
Percherons	5	1,780	5	All	Fair	484	15
Hackneys, Imported	3	1,300	9½	All	Good	196	15
Hackneys, Canadian-bred	2	1,200	4½	All	Fairly good..	135	15
Grades, Hackney	1	....	......	....	....	....	....
Standard-breds, Imported	10	1,100	8½	All	Fairly good..	209	15
Roadsters, Canadian-bred	3	1,060	6	All	Medium.. Good.	160	11
Grades, Roadster	7	1,100	10	All	Fair.	154	10
Thoroughbreds, Imported	5	1,100	10	4	Fair.	232	10
Grades, Thoroughbred	2	1,050	11	All	Fair.	40	10
German Coach Horses, and French Canadian and Grade French Canadian (1 German, 1 French, Canadian, 1 French Canadian Grade)	3	1,325	13	All	Medium. .	229	10
Total	55					3,150	

Elgin—Concluded.

MARES.

Townships.	Number of mares bred to stallions inspected in Township.	Type.	Average weight. Pounds.	Average quality.	Average age.
Southwold	650	Draught, General Purpose and Roadster	1,200	Fair	7
Dunwich	741	Two per cent. light, rest Draught	1,350	Good.	5
Yarmouth	324	General Purpose, Roadster and a few draught	1,100	Only fair.	8
Malahide	751	Inclined to be light Hackney and Roadster	1,000	Fair.	8
Bayham	288	Bad, very light	950	Bad	10
Aldboro	396	General Purpose and leaning to Clydesdale	1,150	Medium	9
Total	3,150				

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions	44	2,845	43	2,775	13	1	70	10
Grade Stallions	11	305	11	305	9	....	....	....
Totals	55	3,150	54	3,080	....	1	70	....

Public meetings in the County of Elgin were held at Aylmer on October 7th, and at St. Thomas on November 9th.

At the Aylmer meeting the majority of those present were in favor of stallions being licensed and registered, and it was also the opinion of the meeting that if an Inspection Act was enforced by the Government, there would be no difference whether a horse were syndicated or bought by a private individual. It was suggested that more time be devoted to questions relating to the breeding of horses at Farmers' Institute meetings, or that a special series of educational meetings should be held. It was stated that the sale of too many good mares, the use of too many poor stallions, the indiscriminate breeding of horses, and the importation of western horses, all contributed to the depreciation of the quality of our horses.

At the St. Thomas meeting it was resolved that the report prepared and presented by the St. Thomas and Elgin Horse Association be adopted. This report stated that resolutions had been passed favoring the syndicating of stallions, in favor of a Stallion Inspection Act, and in favor of the Government giving prizes for mares at horse shows and fairs in the County of Elgin.

LAMBTON.

In Brooke township, heavy breeds are to the light as 5 to 4. Three Clydesdales and two Shires, all pure-bred, and four Roadsters (one a grade), compose the list of sires. All are rated sound. Two are 13 years old. Their standard, as regards conformation, action and general worth is very fairly good. Ten dollars is the lowest, and fifteen the highest fee charged. The 1,200 mares kept are somewhat of the draught type, others are general purpose, and a few Roadsters. Average weight runs about 1,150 lbs., while quality is medium, and the average age 7 years.

The breeding stock of mares in Euphemia township, totals 700, are general purpose in style, and average 1,100 lbs. Their quality is only medium, and average age 9 years. Two Clydesdale sires, and one Hackney are kept for service; two of these have only been standing for service for one season. No unsoundness is reported, and the average rating is fairly good. For one Clydesdale, a grade, the service fee is $8, for the pure-bred, $12.

As the 1,800 mares kept in Warwick township are mostly draught, with some Roadsters, we find Clydesdale sires in the majority. The mares average 1,250 lbs., their quality is good, and average age is 6 years. No less than 8 out of the 13 stallions in service are Clydesdales, only o e being a grade. Roadsters come next in point of numbers with four, two of which are grades, and there is one Carriage stallion. Four of the total are newcomers. The average for conformation, and action is fairly good. Starting with $8 for a grade, the service fees run up to $12.

In Plympton township there are about 1,200 mares of very mixed type, averaging 1,100 lbs., and only fair in quality, with an average age of 8 years. Stallions number 18, 12 pure-breds, and 6 grades. Service fees are as low as $7, and as high as $12. Most of the stallions are sound, and barring some very aged horses, scored fairly well. Roadsters lead with eight. Clydesdales number six, and there is one each of Shires, French Canadians, German Coach, and Thoroughbreds.

Bosanquet township favors Clydesdales, 3 out of 4 of the sires being of that breed, and the other a German Coach. All are sound, but the average quality is not as high as it might be. There is considerable of a Clydesdale type in the 1,500 mares in this township, their average weight being 1,200 lbs., and quality fair, and average age 7 years. Service fees are $10 to $15.

In Sarnia township breeding proceeds largely on Roadster lines, there being four sires of this breed to one Clydesdale, one Percheron and a Hackney. Three of the Roadsters are grades; all the sires are sound. In conformation the average is fair, but the percentage of colts is small. Ten to fifteen dollars are the fees charged. The report on the mares describes them as of general purpose type, and not very good, averaging 1,100 lbs. in weight, and in quality not as good as they might be. Their average age is 9 years.

Considering that in Moore township there are about 1,100 mares of fair quality, weighing 1,200 lbs., and mostly of Clydesdale and Shire draught type, the balance being Roadster and Percheron, the proportion of 5 Clydesdale stallions to one Percheron, a German Coach Horse, and three Roadsters is not excessive. Of the stallions, three are grades, and all are fairly sound, while four are well up in years. Four rank well as to conformation and action, and others are about the average. Service fees are comparatively small, $7 to $12.

Lambton—Continued.

Two Roadsters, a Clydesdale, and a Percheron represent the breeds as sires in Sombra township, which contains 700 mares, general purpose and mixed in type and not very good in conformation or quality. They average 1,050 lbs., and average age is 9 years. The stallions are all sound, and are fair in conformation and action. They are all grades. Fees are low from $7 to $10.

Medium is the quality of the mares in Dawn township, which average 1,150 lbs. in weight, and are of a medium Clydesdale type, some having Roadster and Shire characteristics. Their average age is 8 years. There are only three stallions in the township, two Clydesdales (one a grade), and a Shire, the latter in his first season. They do not average very high in rating, and service fees average from $8 to $15, the former for the grade.

In Enniskillen township, sires of the heavy breeds are in the majority, there being five Clydesdales (two being grades), one Shire, two Roadsters, and a French Canadian. With four exceptions the quality is not extra good, but all are fairly sound. In ages, they range from 2 to 9 years, and service fees from $8 to $12. The percentage of foals is fairly good in most cases, Mares total 1,200, and are of Clydesdale and Roadster type. Their average weight is 1,200 lbs., quality fair and average age 7 years.

STALLIONS.

Breeding.	Number.	Average weight. Pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	16	1,760	8	All	Medium good	1,650	11
Clydesdales, Canadian-bred	11	1,740	10	All	Fair	1,287	10
Grades, Clydesdale	9	1,475	7	All	Fair	542	8
Shires, Imported	3	1,930	9	All	Good	393	12
Grades, Shire	2	1,625	8	All	Fair	155	10
Percherons, Imported and Grades. (2 Pure-bred, 1 Grade)	3	1,460	9	All	Medium good	272	9
Hackneys, Imported	2	1,250	5½	All	Good	189	12
Standard-breds, Imported	9	1,167	10	All	Good	675	12
Roadsters, Canadian-bred	5	1,150	7	All	Fairly good	245	10
Grades, Roadster	13	1,050	7	All	Very Fair.	661	9
Thoroughbreds, Imported	1	1,300	20	All	Fair	75	10
German Coach Horses	3	1,350	13	All	Medium good	225	11
French Canadian, and Grades and Cleveland Bay (1 French Canadian, 1 Grade French Canadian, 1 Grade Cleveland Bay)	3	1,375	6	All	Fairly good	196	10
Totals	80					6,565	

Lambton.—Concluded.

MARES.

Townships.	Number of mares bred to stallions inspected in Township.	Type.	Average weight. Pounds.	Average quality.	Average age.
Brooke	976	Somewhat Draught, General Purpose and some Roadsters	1,150	Medium	7
Euphemia	226	General Purpose	1,100	Only middling	9
Warwick	1,176	Mostly Draught with some Roadsters	1,250	Good	6
Plympton	1,420	Very mixed	1,100	Only fair	8
Bosanquet	472	A good deal of Clydesdale blood	1,200	Fair	7
Sarnia	483	General Purpose and not too good	1,100	Not too good	9
Moore	712	Mostly Draught, Clydesdale and Shire, and some Roadsters and Percheron	1,200	Fair	6
Sombra	156	General Purpose, not very good	1,050	Not good	9
Dawn	235	Medium, Clydesdale and some Roadster and Shire	1,150	Medium	8
Enniskillen	709	Clydesdales and Roadsters	1,200	Fair	7
Total	6,565				

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions	53	5,096	53	5,096	11	....	....	....
Grade Stallions	27	1,469	27	1,469	9	....	....	....
Totals	80	6,565	80	6,565	....	....	....	...

The public meeting for the county of Lambton was held at Petrolea, on November 19th. There were present about thirty breeders and others interested in horse breeding.

After considerable discussion, those present put themselves on record as favorable to an Inspection and Licensing Act, and that after a reasonable time, there should be compulsory legislation. Some of the reasons given at the meeting for inferior quality among the horses were the sale of the best mares to outside buyers, the syndicating of inferior stallions, and the inability of the average farmer to detect unsoundness. The use of inferior sires, owing to cheaper fees charged, was also one prominent cause of deterioration of stock.

An informal meeting was held in the Council Chamber, Forest, November 13th. It was unanimously agreed that an Inspection and Registration Act would help the horse industry. The holding of spring shows for stallions, under the auspices of the Agricultural Society was highly recommended.

SPECIAL REPORT OF INSPECTORS.

In the first place we wish to say that it is not possible for us to give as full and comprehensive a report as we would have done had more time been placed at our disposal. We were not able to inspect every stallion in each district, and therefore did not come in contact with the breeders and users of such animals.

However, we are of the opinion that the Department could not have made a more popular move than to give consideration to the adoption of an Inspection and License Act. Resolutions in favor of these points have been unanimously adopted at all our meetings, and in fact by all individuals with whom we had the privilege of talking about these subjects.

As to the condition of the horse breeding industry, we might say that it certainly requires some directing. There are many causes for the present condition. The first and greatest has been indiscriminate and careless breeding. In the second place we hear complaints from the owners of stallions, of the great scarcity of good mares of all breeds or types to breed from. During our trip this was a very noticeable fact. Some attribute it to the high prices being offered by farmers and breeders of Manitoba and the other western provinces. This may be partially true at the present time; still we cannot but think that carelessness and lack of interest, or, in other words, lack of foresight on the part of the farmers and breeders, is to a great extent responsible for the present bad conditions of our brood mares.

As a Province we are peculiarly situated, having perhaps better facilities in this country than in any other for the breeding of high class, well bred horses of any type or breed. Our surroundings are such as to bring us in close proximity to the best markets of America. In fact, some years ago the great republic to the south of us were purchasers of a great number of high class horses which were bred in our Province at that time, namely, the draught horse, and the high class harness and saddle horse; and we venture to say if the people of this Province had been more careful to breed along the lines of the foundation laid in this country thirty or forty years ago, we would to-day be head and shoulders above any other country in being able to produce the best of the above mentioned classes.

The existing evils can partially be remedied by education, but the general opinion is that an Inspection Act will have the greatest tendency to improve the present conditions, from the fact that no stallion inferior in breeding and individuality would then be given a permit to go into commission. Therefore the breeders and users will not have to withstand the solicitations of wily horse owners inducing them to use undesirable animals, which, coupled with a desire for a cheap fee, has been one of the chief factors in bringing about the present low standard. It is impossible to buy a first-class horse for commercial use from the farmers of this Province.

Another cause which stands out prominently as a factor leading to the present conditions is the syndicating system. This fact has been impressed upon us for a number of years, and we found on our trip over five counties that in nearly every case animals sold by this system were of a very inferior quality, and cost from twenty to thirty per cent. more than a first-class animal of the same breed cost private individuals. This has also been the opinion of most of the people we met, and we believe that it is high time that this kind of unscrupulous plundering was stopped.

Another reason why an inspection placed in competent hands would be of great service, is that it would have a tendency to make importers and speculators more careful in making their selections, knowing that individuals

Report Inspectors District 1—Concluded.

or companies would not purchase unless the animal or animals had passed inspection.

LICENSING FEES.

In considering what fee should be charged in connection with licensing, it would be well to have as low a rate as possible, so that the horsemen might not consider it a hardship. In discussing this point at our meetings the concensus of opinion was that the fee should be large enough to make the Act workable. Some are of the opinion that five dollars should be the outside charge. We also think that this amount would be quite within the bounds of reason, and would be satisfactory to all concerned. This fee, of course, would cover the cost of issuing the license and inspection permit.

PUBLIC MEETINGS.

Public meetings were held at Chatham, Aylmer, St. Thomas, Forest, London, Essex and Petrolea. In each place the meetings were small in numbers, but made up for that in enthusiasm. Each meeting entered heartily into the discussion of the several points in question, namely, the licensing and inspection of stallions, together with a recommendation for registration. In every case we endeavored to encourage discussion on the part of those attending the meeting, our part being to receive the views placed before us. In each meeting we asked for a vote coupling together the license and inspection, taking up the registration separately. Each meeting gave an unanimous vote in favor of each of these votes. From the apparent feeling of those we came in contact with in the district visited by us, we are firmly of the opinion that public opinion is ready for regulations of this nature.

AS TO CONDITIONS FOUND IN EACH COUNTY.

Middlesex and East Lambton have probably the greatest number of good stallions in each and every class; they have also the best class of brood mares.

East and West Elgin come next, having a few as good as any we have seen in the above mentioned counties.

West Lambton being a comparatively new district, is somewhat behind, but breeders seem to evince a desire to improve their conditions.

East and West Kent seem to pay more attention to the producing of speed, irrespective of conformation and quality, yet in these ridings we met a few extra good types of the standard-bred trotting horse.

North Essex is away behind in all classes. We only saw one fairly good stallion in that riding.

South Essex has a mixed breed of a very poor quality.

As to the conditions predominating in each county, we find that they have all equal facilities for breeding any class of horse required for the market, of this or any country.

In our opinion the horse industry is one of the greatest, if not the greatest, branch of live stock, and we, together with all interested in the industry, are glad that the present important step has been taken, and trust, and in fact know, that you will receive the strong support of every right thinking man.

In conclusion, we think it would be well for the Department to place before the breeders of the Province the real requirements of our existing markets, what they are at present, and also the great expectations in connection with the development of our country.

(Signed) WM. SMITH,
J. D. GRAHAM.

DISTRICT NO. 2.

Counties.—Halton, Wentworth, Brant, Oxford, Norfolk, Haldimand, Welland and Lincoln.

Inspectors.—John Gardhouse, Highfield; Wm. Cain, V.S., Perth.

HALTON.

In the township of Esquesing the majority of the sires are of the lighter breeds, but two Clydesdales are kept for service. The different breeds represented are Roadsters, four (two being grades), Carriage, two (one a grade), and Clydesdales, two. In one instance the stallion was not seen owing to his owner being away from home. The average of soundness is low, only about one-half, while conformation also averages only fair. The service fees are correspondingly low, from $6 to $10, with one of $15. The Carriage stallions are among the best of those seen. Mares number but 262, of an average weight of 1,050 lbs. and average age 9 years; they are poor in type, and average quality is very poor. In commenting on this township the Inspectors say: "A large percentage of the stallions in this township should never be used for breeding purposes. Your committee are of the opinion that the horse industry would be very much improved in this township by the introduction of a few good stallions, as well as a large number of mares."

In Nassagaweya township there are four stallions, and only one pure-bred among them,—a Percheron. The rest are grades of Percheron, Roadster, and the French-Canadian type respectively. All are sound, and their conformation is generally good, the pure-bred being reported as of good type. $10 is the fee generally charged for service. There are 358 mares in the township, poor in type and average quality, average weight being 1,100 lbs. and age 9 years. Most of the mares in the township are bred. There are a few very good mares, but most are of no breeding, and not of good quality. One of the stallions would have made a good gelding.

Trafalgar township has long been noted as a breeding ground for light horses, of which some good specimens have been bred in the past. The leaning is still towards light horses, as is seen by the list of sires, among which are three Thoroughbreds, two Carriage horses (one a grade), two Hackneys. a German Coach, a Standard-bred, two Percherons (one a grade), two Clydesdales (one a grade), and a Shire grade. Eleven out of the list are sound and with the exception of four are of a good or fairly good type. Service fees are from $10 to $15, but in the case of a Thoroughbred the fee is given as $50. Mares number 784, and are of fair type and quality, averaging in weight 1,150 lbs. The Inspectors state: "Farmers in this township appear to be paying a little more attention to breeding, and also to the selection of sires, though, perhaps using more light sires than is in the best interests of the horse industry in a township like Trafalgar. A few young pure-bred mares have been purchased by farmers in this township for breeding purposes."

Nelson township runs a little more to heavy horses than Trafalgar. There are four Clydesdales and a Shire, all pure-bred, standing for service here as against two Standard-breds and a Roadster. Of the eight sires, six are sound or serviceably sound, and their type and conformation is mostly good. Two are 16 years old. There are a few very good registered mares in the township, but the type and quality of the majority of the mares are poor. They average in weight, 1,100 lbs., and in age 7 years. More attention is paid to the breeding of heavy horses in Nelson township than in any of the other townships in Halton county.

Halton—Continued.

Inspectors' Remarks: "In the county of Halton your committee think that the heavy horse is the most suitable one for the average farmer to breed. We find that there are very few good mares to breed from, and no system followed by most of the breeders, some mares with one, two and even three heavy crosses in them being bred to poor light stallions, and poor light mares being bred to heavy horses. We also found that too often when a farmer has a mare that is used up and no good, he at once breeds her and tries to raise a colt. Suggestions were made that the Ontario Department of Agriculture distribute some literature that would impress on the farmers the advisability of breeding to type, and only breeding such mares as are suitable to raise colts that are sound, and that this would help the horse industry very much."

STALLIONS.

Breeding.	Number.	Average weight. Pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported, Canadian-bred and Grades (4 Imported; 3 Canadian-bred, 1 Grade)	8	1,635	5	3	Fairly good.	485	10
Shires, Imported and Grades (1 Pure-bred; 1 Grade)	2	1,800	11	All	Fairly good.	210	12
Percherons, Imported	2	1,800	5	All	Good	90	.....
Grades, Percheron	2	1,575	5	All	Good	170	10
Hackneys, Imported and Canadian-bred (1 Imported; 1 Canadian-bred)	2	1,050	4	1	Good	90	14
Standard-breds, Imported	2	1,100	9	All	Good	65	11
Roadsters, Canadian-bred	3	1,060	6	2	Fairly good.	140	9
Grades, Roadster	4	1,160	12	All	Fairly good.	183	10
Thoroughbreds, Imported	3	1,170	14	All	Good	179	20
German Coach Horses and Grades and French Canadian Grades (1 Grade Coach; 1 Grade French Canadian; 1 German Coach Horse)	6	1,345	7	All	Good	347	10
Totals	34					1,959	

MARES.

Townships.	Number of mares bred to stallions inspected in Township.	Type.	Average weight. Pounds.	Average quality.	Average age.
Trafalgar	784	Some Clydesdale, Carriage and a few Roadsters	1,150	Fair	8
Esquesing	352	Light mostly	1,050	Very poor	9
Nassagaweya	358	General Purpose as a rule	1,100	Poor	9
Nelson	465	Heavy, with a few light	1,100	Poor	7
Total	1,959				

Halton.—Concluded.

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions..	21	1,216	15	986	13	6	230	10
Grade Stallions......	13	743	12	708	10	1	35	10
Totals	34	1,959	27	1,694	....	7	265	....

The public meeting for Halton was held at Milton on October the 11th. All the speakers recognized that there was room for great improvement in horse breeding in Halton county. The syndicating of stallions was very strongly condemned, and those present thought that there should be an inspection of all stallions before they were allowed to stand for service, some favoring a license fee, while others seemed to think that the stallion owner had enough expenses at present.

WENTWORTH.

In the townships of East and West Flamboro nine stallions are standing for service, and out of these there are two Thoroughbreds, both of excellent type, two grade Roadsters, two pure-bred Percherons, a grade Carriage horse, a Shire and a German Coach horse. Seven are serviceably sound, and the conformation and quality of most of them is up to the average. $8 to $10 are charged for service fees in most instances. Mares are poor in type and quality, averaging 6 years old, and 1,150 lbs. in weight. The Inspectors speak highly of the Thoroughbred sires, but think that some of the other sires should have been gelded. About twenty registered mares were found in the township.

There is not one sire heavier than a Percheron to be found in Beverly township. The list is made up of two Thoroughbreds, three Carriage stallions, a French-Canadian, a Roadster, a German Coach, and a Percheron. Only one case of unsoundness is reported, but quality and conformation is below what it should be. Fees for service range from $8 to $15. There are about 20 registered Clydesdale and Shire mares in this township, the balance being of a rather common type, averaging 1,150 lbs. in weight. Reporting on this township the Inspectors say: "We only found one imported horse here, and the stallions in general are not a very good class for the farmers to breed to. As there are a number of registered heavy mares it is important that there be good imported stallions of the same breeds to mate with them."

Out of the nine stallions in the City of Hamilton and surrounding township of Barton, one-third are not sound, while one is 21 years old, and another 11 years. Two are Thoroughbreds, three Standard-breds, one a Shire, one a Percheron, and the remaining one a grade. Their average for breeding purposes is low. The mares in this section are not of good type or quality, *Wentworth*—Continued.

not over 1,100 lbs. on the average. One reason for this given by the Inspectors is that breeders are paying too much attention to race horses. The general run of service fees is $10 to $15, with one owner quoting $25.

A Percheron, a Roadster, and a Standard-bred comprise the sires in Saltfleet Township, the last named being of good type, and others fair. Two are reported sound, and their service fees run from $8 to $12. As regards the mares, these are of a poor light type not fitted for farming operations. "There seems to be very little breeding in Saltfleet Township" is the report of the Inspectors.

The Inspectors state: "We found a rather better class of horses in Binbrook Township, but there is still room for improvement. Farmers seem to have no fixed type. More heavy horses could be bred with advantage here. Mares are fair in type and quality, averaging 1,100 lbs. in weight." It is creditable that all the stallions standing for service are sound. Among them are a grade of Clydesdale blood, and another of French-Canadian. The breeding of the rest is: Standard-breds, three; English Coach, one; and Hackney, one. In conformation they average fairly good. The fees for the two grades are $7 and $8 respectively and for the pure-breds from $10 to $15.

Not one heavy stallion was inspected in Glanford Township, and farmers apparently are paying very little attention to horse breeding. The Inspectors report that some good heavy stallions and mares would be a good investment for farmers and breeders here. At present the mares are of no special breeding, and only average fair in quality, having an average weight of about 1,150 lbs. The rating of the stallions used is, on the whole, rather medium, but all are sound. They include a Hackney, two Standard-breds, a grade German Coach, and a grade Carriage horse. Fees vary from $10 to $15.

Breeders in Ancaster Township are turning their attention more to breeding heavy horses and three Clydesdales were among the seven sires on service here. One is a Welsh pony, rated good, one a Percheron, one a Carriage horse, and two Roadsters (one being a grade). They are nearly all sound and score fairly well; service fees range from $10 to $15. There are twenty-one imported mares in the township, besides several registered Canadian-bred Clydesdale mares, and the general type and quality are fairly good.

Inspectors' Remarks: "In Wentworth farmers seem to have no fixed type. Far too many are breeding to light sires for the best interests of the horse industry. While we think that this county is one in which light horses can be raised with profit, yet too many farmers are making a mistake in breeding mares of a fair farm type to light road horses, some of which have very little breeding."

Wentworth—Continued.

STALLIONS.

Breeding.	Number.	Average Weight. Pounds.	Average Age.	Serviceably Sound.	Average Conformation.	Number of Mares Served.	Average Service Fee. $
Clydesdales, Imported, Canadian-bred and Grades (3 imported; 1 Canadian-bred; 1 grade)........	5	1,640	6	All.....	Fair.......	322	10
Shires, Imported................	2	1,800	4	All.....	Fairly good	105	12
Percherons..................	6	1,800	7	All.....	Mostly good	310	12
Hackneys, Imported and Canadian-bred (1 imported; 1 Can.-bred).	2	1,375	5	All	Fairly good	195	12
Standard-breds, Imported and Roadsters, Canadian-bred (1 Standard-bred; 7 Roadsters	8	1,190	9	7........	Fairly good	234	12
Grades, Roadster..................	7	1,125	8	All	Fair.......	324	10
Thoroughbreds, Imported.........	3	1,060	9	....	Fairly good	....	......
Thoroughbreds, Canadian-bred....	3	1,100	5½	2........	Fairly good	79	12
Grades, German Coach............	3	1,370	8	2........	Fairly good	270	10
English Coach Horse and Grades (1 pure-bred; 6 grades)............	7	1,350	13	6........	Fair........	366	9
Grades, French-Canadian and no particular breeding..............	3	1,225	10	All	Fairly good	278	11
Welsh Pony....................	1	....	......	....	Good......	7	......
Totals.......................	50					2,490	

MARES.

Townships.	Number of Mares bred to Stallions inspected in Township.	Type.	Average Weight. Pounds.	Average Quality.	Average Age.
East and West Flamboro.	410	Mostly small, a few good registered Clydesdales....................	1,150	Poor....	6
Beverly.................	538	A few registered Clydesdales and Shires, balance light.............	1,150	Fair.....	7
City of Hamilton and Barton...............	193	Light and rather poor	1,100	Poor....	7
Saltfleet.................	120	Light and rather poor.............	1,000	Poor ...	8
Binbrook...............	534	More inclined to general purpose...	1,100	Fair.....	8
Glanford...............	280	Light as a rule....................	1,050	Fair.....	8
Ancaster................	415	Some Imported and Canadian-bred heavy mares, others general purpose and light...............	1,150	Fairly good..	8 8
Total...............	2,490				

Wentworth—Concluded.

Mares Bred to Different Classes of Stallions.

Stallions.	Total.		Serviceably Sound.			Not Serviceably Sound.		
	Number of Stallions.	Number of Mares Bred to.	Number of Stallions.	Number of Mares Bred to.	Average Fee.	Number of Stallions.	Number of Mares Bred to.	Average Fee.
					$			$
Registered Stallions.	30	1,271	28	1,262	13	2	9	8
Grade Stallions......	20	1,219	18	1,091	9	2	128	9
Totals	50	2,490	46	2,353	....	4	137	....

The public meeting for this county was held at Dundas on October 16th. Those present were in favor of the Government taking some steps to prevent poor, inferior, and unsound stallions from being used for breeding purposes, and if the time is ripe to have all stallions inspected. Some of the speakers stated that the stallions now used for breeding are not as good as those that used to travel some years ago.

Brant.

While South Dumfries township favors the heavier sires to a considerable extent, having two Clydesdales, two Percherons, a general purpose grade, a French Canadian grade of a heavy type, and a grade Carriage horse, there is plenty of room for improvement in the ratings of the majority of them as regards soundness, conformation and quality. There are a number of very good mares in this township, some being newly imported Clydesdales. The general run of mares is of fairly good type, and very good quality, being young and of good average weight. From $8 to $15 is the run of service fees.

Brantford township has a fair representation of sires, consisting of five Clydesdales (of which no less than three are grades), two Hackneys, a Percheron, a general purpose horse, and a grade French horse. While some are of pretty fair type, the Inspectors state that some should not be used as sires. As regards soundness nearly all qualify as serviceably sound. Service fees vary from $7 and $8 for grades, to $15 for pure-breds. The general run of mares is rather poor as regards type and quality, 1,150 lbs. being the average weight, and 10 years the average age. A few Hackneys of a better type have lately been imported. Not many heavy mares are being bred.

Nothing but grade stallions, two Roadsters, a Carriage horse, and a general purpose horse were seen on the Indian Reserve, $10 is charged for service fee. The number of mares kept is 175, and out of these the Inspectors only saw two that looked like being useful brood mares. They report this section as being one in which many useful horses could be raised, and that something should be done to raise the standard of the horses, especially as to introducing heavy horses, as most of the land is heavy.

Brantford city and neighborhood, are well known as a centre of Standard-bred breeding, almost to the exclusion of other breeds. In the heavy

Brant.—Continued.

line, nothing better than two Clydesdale grades are found, only one of which was seen by the Inspectors. They were also unable to see several of the others. Besides eleven Roadsters and Standard-breds (five of which are grades), and the two grade Clydesdales, there are, a Hackney, a Hackney pony, a Shetland pony, and a German Coach horse. A few are rated high, but several are below the average, and some are unsound. The fees for services are in general from $9 to $15, with one quoted at $20, one at $25, and one at $50, all three being for Roadsters. Mares are on the whole a very inferior lot, but there are a few very good light ones. Their average weight is 1,000 lbs., and age 10 years. The Inspectors think that too many trotting bred stallions are being used for breeding purposes, and that the horse interests would be served by the introduction of a few good pure-bred heavy stallions.

The stallions located in Burford township are a very poor lot, being all grades, one of Hackney blood, one Roadster, one Belgian, and the other general purpose. Service fees are $8 to $10. Mares are also a very poor class, not exceeding 1,000 lbs. in weight. The Inspectors comment as follows: "We understand that a few fair horses made stands in this township from adjoining townships."

Inspectors' Remarks: "The county of Brant is well supplied with stallions so far as numbers are concerned, but there are not enough of the right kind. Brant is well adapted for the raising of heavy horses, and we think that if farmers and breeders would pay more attention to the breeding and raising of heavy horses, it would be a great advantage both to themselves and to the horse industry of this county."

STALLIONS.

Breeding.	Number.	Average weight, Pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	3	1,850	7	All	Fair	345	14
Clydesdales, Canadian-bred	1	1,550	2	All	Good	....	......
Grades, Clydesdale	5	1,600	9	4	Fair	355	7
Percherons	3	1,870	5	All	Fairly good	208	13
Hackneys, Imported	2	975	6	All	Fairly good	190	12
Hackneys, Canadian-bred	2	1,250	4½	All	Fair	210	15
Grades, Hackney	1	950	2	All	Fair	8	10
Standard-breds, Imported	3	1,120	8	All	Good	180	18
Roadsters, Canadian-bred	3	1,090	6	2	Fairly good	55	15
Grades, Roadster	8	1,000	7	6	Fair	95	10
German Coach Horses and Grades (1 Pure-bred, 2 Grades)	3	1,125	3½	1	Fair	138	10
Grades, French Canadian and Belgian (2 French Canadian, 1 Belgian)	3	1,525	10	2	Fair	140	9
Shetland Pony	1	......	...	....	....	....	......
Grades, (general purpose)	4	1,300	10	3	Only fair	270	8
Totals	42					2,194	

Brant—Concluded.

MARES.

Townships.	Number of mares bred to stallions inspected in Township.	Type	Average weight.	Average quality.	Average age.
South Dumfries	425	A few very good imported Clydesdales	1,150	Very good	5
Brantford	824	Mostly light	1,150	Poor	10
Indian Reserve	49	Very light and poor	950	Poor	9
City of Brantford and suburbs	746	Mostly light and inferior	1,000	Poor	10
Burford	150	Mostly light and inferior	1,000	Poor	10
Total	2,194				

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions	19	1,270	18	1,270	15	1	....	....
Grade Stallions	23	924	16	691	9	7	233	9
Totals	42	2,194	34	1,961	....	8	233	....

The public meeting of Brant was held at Brantford, on October the 20th. There were not very many present, but every one there was given the opportunity to express his views. One speaker said that the only way to improve the standard of their horses was for the Ontario Department of Agriculture to get the Legislature to pass an Act making it compulsory that all stallions kept for service be inspected and registered. Another speaker said that while that would be a very stringent measure, he was unable to see how they were going to get rid of the mongrel class in any other way, and all were agreed that the mongrel horse was and has been most detrimental to the horse industry. As regards syndicating stallions, those present were generally agreed that the system could be successfully carried out, if there were not too many in the syndicate, and the horses were purchased at their proper value.

OXFORD.

There are a number of very good imported heavy stallions and mares in West Oxford township; also some good Hackneys. In spite of this many farmers are using some of the grade sires to be found here, for one of which, a grade Clydesdale, only $6, is asked for service fee. The usual range, however, is from $10 to $15, and one as high as $20. Among those on service are six pure-bred Clydesdales, one grade Clydesdale, two Hackneys, three grade Carriage horses, four Roadster grades, and a Coach grade. The majority are sound, but some are well up in years, one as old as 21 years. In this township are a number of very good Clydesdale fillies imported this year, and the average type and quality of the mares in the township, estimated at 680, is fairly good, average weight being 1,200 lbs.

The number of stallions in North Norwich township is not large, consisting of three, all grades, one respectively of Standard-bred, French, and Clydesdale blood. They are all sound. Eight and ten dollars are the service fees charged. Mares are only a fair lot, in number 250 and not of a distinctive type.

Stallions are more numerous in South Norwich township, among them being a good Clydesdale, Hackney and Percheron. Here, too, we find three grade sires, a Belgian, a general purpose, and a cross-bred Clydesdale and Shire. The service fees are as low as $8, and from $10 to $15 as the general run. The mares here are 420 in number, of a fair type and quality in general, while there are some 20 or 30 imported fillies to be found in the township, which are a very good lot, too good for some of the stallions used, so the Inspectors say.

Nineteen stallions travel in Dereham township, no less than eight being grades, and some of them of an inferior type, not to mention unsoundness. Among them are four pure-bred Clydesdales, one Shire, one Thoroughbred, four Roadsters, and a Percheron; while the grades are six Roadsters, one Belgian and a Clydesdale. The service fees range from eight to fifteen dollars, the lowest, of course, for grades. Mares are of various types, being only fair in quality, and evidently too many are being bred to poor sires.

There is an improvement of quality in the sires in North Oxford township, although only four in all, all being pure-breds, three Clydesdales and one a Standard-bred; all, too, are sound. From $10 to $15 are the service fees charged. Mares share in the improvement in quality which is fair, and there are a few very nice imported Clydesdale fillies and some Hackney fillies in the township.

"There are some useful animals in Blenheim township," say the Inspectors, "and most of the farmers seem to be breeding heavy horses and showing good judgment in the selection of sires." Out of the seven stallions found here, however, there are only three pure-breds (two Clydesdale and a Percheron) to four grades (two of Clydesdale, one of Roadster, and one of Carriage blood). Here fees run from $8 to $15. There are some very good mares to be found in the township, the average weight being 1,250 lbs., and average quality fair.

With the exception of a grade Roadster all the ten stallions found in Woodstock and the adjoining township of Blandford are registered. Quite a variety of sires are kept, ranging from two Clydesdales, three Standard-breds, a Thoroughbred, a Hackney, and an Arabian, to a Shetland pony. With a single exception they are sound, though not grading as high in quality and conformation as they might, a fact commented on by the Inspectors, who found some useful mares here, including a few imported Clydesdales. The general run of mares average 1,200 lbs., and are fair in type and quality.

Oxford—Continued.

The townships of East and West Zorra are well known as a section where heavy horses are well patronized, and, consequently we find nearly all the sires of the heavy breeds. Six Clydesdales (one a grade) a Shire, a Hackney and a Roadster comprise the total, and they all are rated fairly well, while the lowest service fee is $11, and the highest $20. Mares, too, among which are a number of excellent imported Clydesdale fillies, average very good and are of a good type, weighing about 1,300 lbs., and average age six years.

Of East Nissouri the Inspectors say: "In this township we did not see one real good stallion, but we learned that a few good imported heavy stallions from adjoining townships made stands in East Nissouri." The mares here are of a fairly good type, in weight about 1,150 lbs., and in quality very good. A number of them are registered Clydesdales, and a good many are of a very fair type with two or three crosses of heavy blood. Out of the six sires only one, a German Coach horse is pure-bred. There are three grade Clydesdales, and two Roadster grades.

Inspectors' Remarks: "In Oxford county there has been during the last few years quite a number of good imported Clydesdale stallions brought in, also a number of good imported young mares, which, if taken advantage of by the farmers, should, if properly mated, improve the present standard very much. As far as we are able to learn many of the farmers appear to be breeding a better class of mares and showing very good judgment in the selection of sires, but there are still quite a number that are using the poor, cheap horse."

STALLIONS.

Breeding.	Number.	Average weight. Pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
Clydesdales, Imported	20	1,700	6	All	Fairly good	1,190	$15
Clydesdale, Canadian-bred	4	1,700	7	All	Fair	265	10
Grades, Clydesdale	9	1,550	5	All	Fair	324	9
Shires, Imported and Grades (2 imported, 1 grade)	3	1,785	8	All	Fairly good	220	11
Percherons	3	1,400	6	All	Good	385	11
Hackneys, Imported	5	1,240	4	All	Very fairly good	235	15
Standard-breds, Imported	6	1,130	13	All	Fair	240	12
Roadsters, Canadian-bred	2	975	5	All	Fair	1	15
Grades, Roadster	16	995	9	10	Fair	516	9
Thoroughbreds, Imported	2	1,150	9	All	Good	162	15
German Coach Horses and Grades (1 Pure-bred, 1 Grade)	2	1,225	9	All	Fairly good	130	11
Grades, English Coach Horse	4	1,250	12	3	Fair	233	11
Grades, French Canadian and General Purpose (1 French Canadian, 1 General Purpose)	2	1,225	8	All	Fair	87	8
Grades, Belgian	2	1,575	5½	All	Fair	167	9
Ponies, Arab and Shetland (1 Arab, 1 Shetland)	2	725	9	All	Good	36	15
Totals	82					4,191	

Oxford—Concluded.

MARES.

Township.	Number of mares bred to stallions inspected in Township.	Type.	Average weight.	Average quality.	Average age.
West Oxford	736	Some good heavy mares, but many light ones	1,200	Fairly good	8
North Norwich	252	Fair	1,150	Fair	7
South Norwich	420	Some good heavy mares and others of lighter type	1,150	Fair	8
Dereham	740	Fair	1,050	Only fair.	8
North Oxford	273	A few good Clydesdales, others medium	1,150	Fair	9
Blenheim	520	Fair stamp of mares, including some good ones	1,250	Fair	8
Blandford and town of Woodstock	521	A few Clydesdales, others medium	1,200	Fair	7
East and West Zora	505	Very good, including many imported Clydesdales	1,300	Very good	6
East Nissouri	224	Fairly heavy, with some good registered Clydesdales	1,150	Very good	6
Total	4,191				

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of Stallions.	Number of mares bred to.	Number of Stallions.	Number of mares bred to.	Average fee.	Number of Stallions.	Number of mares bred to.	Average fee.
Registered Stallions	47	2,734	47	2,734	13	....	....	....
Grade Stallions	35	1,457	28	1,359	9	7	98	8
Totals	82	4,191	75	4,093	....	7	98	....

At the public meeting held at Woodstock, October 27th, attendance was not large, but most of the speakers seemed to think that stallions should be inspected. Some claimed that all stallions used for breeding purposes should be registered, while others asserted that it would not do to shut out stallions which had proved themelves good sires, although they could not be registered, claiming that really good individuals should be allowed a permit. It was thought that there should be an Act passed giving the stallion owners a lien on the mare as soon as she is bred. With regard to syndicating stallions, opinions were given that in some sections, if a syndicate was formed of four or five men and they selected a first-class stallion, better satisfaction would be given than the present system of syndicates which include too many men.

NORFOLK.

In Townsend township there are only two pure-bred sires out of thirteen, and with few exceptions they are not of a very good standard although there is only one case of unsoundness. The pure-breds are a Percheron and a Hackney. Grades are of Clydesdale, Hackney, Roadster, and general purpose stock. A Clydesdale grade is giving service for $5, the highest fee is $15. for the Percheron. "Too many farmers are using grade sires. A few good heavy mares have been bought by breeders during the year."

Woodhouse Gore township is fortunate in being in close proximity to Simcoe, where a number of very good imported horses are owned. These are for sale. Some good fillies, too, have been imported and will make useful brood mares. Otherwise the quality of the average mare is fair. Weight 1,200 lbs., and type very fair. There is only one grade sire, a Hackney, out of nineteen kept. Of the eighteen pure-bred, nine are Clydesdales, two Shires, three Hackneys, three Percherons and one Standard-bred. Fees run from $10 to $15. All are sound and no less than eleven were imported last July.

In Windham township are a pure-bred Clydesdale, a registered Standard-bred and a Percheron grade, and strange to say, the grade earns a larger fee than the second named. $9 to $10 are the fees charged. All sires are sound. Mares are a very poor lot, with only a rare exception.

While the soil of Middleton township is light, and light breeds can be profitably raised, there is room for great improvement in the quality of the horses found here. There are very few good mares, the type and quality being described as poor. The average weight is 1,050 lbs. There are kept for service three pure-bred Roadsters, a Clydsdale, a Hackney, and a Roadster grade, and a general purpose grade. As high as $15, and as low as $8 is charged for fees. No unsoundness is reported.

The stallions in North Walsingham township are not of a very high order, there being too many inferior horses in service, and there is some unsoundness among them. Out of the thirteen, eight are grades of Clydesdale, Roadster, Hackney, and French stock. Among the pure-breds are four Clydesdales and a Suffolk Punch, one of the best. A Hackney grade and a Roadster grade have the lowest service fees, $5; other fees are $7, $8, $9, $10 and $12. There are practically no good mares in this township and their average weight is about 1,100 lbs.

Charlotteville is another township that has a poor class of mares, and as many of the farmers are breeding to inferior grade stallions, prospects are not very bright for raising the standard of horse flesh here. There are only two pure-bred sires, Clydesdales. The rest are two grade Clydesdales, a grade Percheron, and a grade Roadster, and fees are from $6 to $12.

With two exceptions the average of the sires in Woodhouse township is not high, and also there are very few good mares in the section, the general run being poor. Among pure-bred sires kept, are a Hackney, a Thoroughbred, a German Coach horse, and a Percheron, while grades are of Clydesdale, German Coach, Hackney, and Standard-bred blood. Five to twenty-five dollars are the fees for service.

The only representatives of registered stock in Houghton township are a Hackney and a Suffolk Punch. Other sires are a Belgian, Clydesdale, and Roadster, all grades. Service fees run from $8 to $12. Mares are a very poor lot, and there is room for some good heavy stallions.

Inspectors' Remarks: "The County of Norfolk is very well supplied in some townships with a very good class of stallions, there having been a number of good imported horses brought out this year, a number of them

Norfolk—Continued.

being held by the importers for sale. If two or three good men would join together and select a good first-class stallion at a reasonable price, and a number of these were kept in the county it would help to improve the standard of the horses very much, as some of the townships have a very inferior lot of stallions."

STALLIONS.

Breeding.	Number.	Average weight. Pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	14	1,650	5	All	Fairly good	663	12
Clydesdales, Canadian-bred	3	1,700	4	All	Fair	230	10
Grades, Clydesdale	7	1,450	6	All	Fair	225	8
Shires, Imported	2	1,650	2	All	Good	1	15
Percherons	5	1,760	4	All	Fair	160	12
Grades, Percheron	2	1,375	3½	All	Only fair	33	10
Suffolk Punch	2	1,800	7	All	Fairly good	157	10
Hackneys, Imported and Thoroughbreds, Imported (4 Hackneys, 1 Thoroughbred)	5	1,150	9	All	Good	208	12
Hackneys, Canadian-bred	3	1,300	7	All	Good	380	14
Grades, Hackney	5	1,000	3	All	Fair	226	8
Roadsters Canadian-bred	6	1,130	9	All	Fair	397	10
Grades, Roadster	13	1,175	9	9	Fair	869	9
German Coach Horses	1	1,400	8	All	Fair	20	10
Grades, German Coach	1	1,250	4	All	Fair	65	8
Grades—French Canadian, Belgian and General Purpose (1 French Canadian, 1 Belgian, 3 general purpose)	5	1,265	7	All	Fair	369	8
Totals	74					4,003	

MARES.

Townships.	Number of Mares bred to Stallions inspected in Township.	Type.	Average weight.	Average quality.	Average age.
Townsend	700	Mostly light but a few good heavy mares	1,150	Rather poor	8
Woodhouse Gore	565	Several good imported heavy fillies, balance fairly good	1,200	Fair	7
Windham	122	Very poor		Poor	9
Middleton	610	Light and rather poor	1,050	Poor	8
North Walsingham	744	Very poor	1,100	Poor	9
Charlotteville	369	Very poor	1,100	Poor	9
Woodhouse	436	Not many good mares in this township	1,100	Poor	8
Houghton	457	Light and poor	1,050	Poor	9
Total	4,003				

Norfolk—Concluded.

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of Stallions.	Number of Mares bred to.	Number of Stallions.	Number of Mares bred to.	Average fee.	Number of Stallions.	Number of Mares bred to.	Average fee.
					$			$
Registered Stallions..	41	2,216	41	2,216	11	....	....	....
Grade Stallions......	33	1,787	29	1,522	8	4	265	9
Totals........	74	4,003	70	3,738	....	4	265	....

The system of inspection was very freely discussed at the public meeting held at Simcoe, November 3rd, the majority of those attending being strongly in favor of an Inspection Act, a number claiming that only pure-bred sires should be allowed to stand for service. Others, again, would favor allowing stallions that were good individuals and had proved themselves good producers to be used, although not eligible for registration. It was the general opinion that stallions unsound or of inferior type and quality should not be allowed to stand for service. This meeting also favored an act giving the stallion owner a lien on the mare when bred.

The importation of bronchos into the county was very strongly condemned, and those present thought that some action should be taken to prevent any more being brought in, as they were considered a curse to the horse industry.

HALDIMAND.

Seneca township has a good type of mares, good in quality and averaging 1,300 lbs., being, apparently, superior to the sires in service there. The stallions are quite inferior on the whole, the list totalling two pure-bred Clydesdales, a grade Clydesdale and a grade Standard-bred. Fees quoted are $8 to $12.

Oneida township, too, has a good useful lot of mares of about the same weight, including a few registered ones. Here, there is a preponderance of grade sires, there being only one pure-bred Clydesdale to two Roadster grades and one Clydesdale grade. One of the grades earns the highest fee, $15; for the others, the fees are $9 and $10.

As regards Walpole township the Inspectors say: "There are a great many stallions in this township, but only a few really good ones. Farmers, though they have not very many registered horses, have a very good class of mares with some breeding in them, weighing about 1,300 lbs., which they appear anxious to breed to good stallions." Clydesdale sires are eleven in number (four being grades), Hackney three (two being grades), Standard-breds three (two grades), Cleveland Bay one, French Coach horse one, and French Draught one. The lowest fee is $5, and maximum $15.

Not a single pure-bred sire was inspected in Rainham township, and their quality is quite low. A number of good stallions from other townships, however, are being used by farmers who are anxious to secure first-

Haldimand—Continued.

class sires for their mares, which are a very good average lot, with practically no registered ones among them. Their average weight is 1,250 lbs. The sires for service in the township comprise grade Clydesdales, Roadsters, and a Coach horse.

The same condition as to sires prevails in Cayuga township, where four grades of Clydesdale, Thoroughbred, Coach, and Standard-bred breeding stand for service. They are far below the average, and service fees are $8 and $10. Mares are a useful lot, averaging 1,200 lbs., and of fair quality.

In Canboro township there are just three sires, a pure-bred Clydesdale, a Standard-bred and a grade—a general purpose. This is a township in which more and better horses should be raised, and a few good mares and one or two good stallions could do good work in improving the standard. Mares kept are fair in type and quality, weighing 1,200 lbs. on the average. Service fees are $8, $9 and $10. Stallions are rated as fair.

The Inspectors say: "While there are a few very fair horses in the township of Moulton, there is room for one or two good pure-bred sires, and we think that farmers would readily patronize them. Mares here are a very fairly god lot of 1,300 lbs. weight on the average." A pure-bred Clydesdale and a grade of that breeding, two Shire grades, a pure-bred Percheron, and two Roadsters (one a grade), form the stud list; fees are from $8 to $15.

Inspectors' Remarks: "It appeared to us, as far as we were able to learn, that the farmers in Haldimand County were using very good judgment in breeding. They seem to have a lot of very good mares, though very few are registered, and they are using the best stallions they have, and are breeding more to type."

STALLIONS.

Breeding.	Number.	Average weight Pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	5	1,775	13	4......	Very fairly good	399	10
Clydesdales, Canadian-bred	5	1,700	7	All	Fairly good.....	559	10
Grades, Clydesdale	12	1,625	6	10.....	Fair............	663	8
Percherons and Grade Shires (1 Percheron, 2 Grade Shires)......	3	1,700	6	All	Good...........	275	10
Hackneys, Imported, and Grades (1 Hackney, 2 Grades)..........	3	1,150	8	All	Fairly good.....	157	13
Standard-breds, Imported, and Roadsters, Canadian-bred (2 Imported, 2 Roadsters)............	4	1,150	12	3......	Fair...........	278	12
Grades, Roadster and Thoroughbred (9 Roadster, 1 Thoroughbred)	10	1,100	12	9......	Fair............	372	10
French Coach and English Coach, Imported (1 French, 1 English)..	2	1,350	10	All	Fairly good.....	205	10
Grades, English Coach	2	1,250	6	All	Fair............	88	9
French Draught and General Purpose (1 French Draught, 1 General Purpose)......................	2	1,550	5	All	Fairly good....	164	9
Totals................	48					3,160	

Haldimand—Continued.

MARES.

Townships.	Number of mares bred to stallions inspected in Township.	Type.	Average weight, pounds.	Average quality.	Average age.
Seneca	430	Good, fairly heavy	1,300	Good	8
Canboro'	263	A few heavy, mostly fairly light	1,200	Fair	8
Oneida	196	Good, useful type	1,300	Good	7
Moulton	608	Fairly heavy	1,300	Good	8
Walpole	1,297	Very good type	1,300	Good	6
Rainham	227	Fairly good, tending to heavy	1,250	Very good	8
Cayuga	139	Useful grade draught	1,200	Fair	9
Total	3160				

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably Sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions	19	1,679	17	1,452	12	2	227	10
Grade Stallions	29	1,481	26	1,318	9	3	163	9
Totals	48	3,160	43	2,770	....	5	390	....

There was a very good turn out at the public meeting at Fisherville, on November 8th, and some very strong opinions were expressed on certain questions, the present system of syndicating being strongly criticised. It was claimed to be a dangerous one, and that more men had been robbed through it in Haldimand county than in any other district; that one man would be bribed in order to get another, and that it ought to be put down, unless some plan was devised whereby the members of the syndicate would be protected by a guarantee, as, in many cases, counterfeits were substituted.

It was generally held that there was room for great improvement in the horse industry, and that, if breeders would breed with a purpose, we would not have the country full of a class of horses for which there is no demand.

Haldimand—Concluded.

The question of inspecting stallions was also very freely discussed. The opinion of the meeting was taken, and twelve voted for it, while eight were against, the majority of those present not voting either way.

WELLAND.

Wainfleet is a township that would benefit by the introduction of some good sires in the place of the five grades that now stand for service for fees from $5 up to $10. The mares are a fair lot, but better than the stallions in quality.

As a rule there appears to be very little interest taken in breeding in Pelham township. The mares are only fair and are not over 1,150 lbs. in weight. A Thoroughbred, Clydesdale, Shire, Hackney and Standard-bred, all pure-bred, and a Roadster grade and Percheron grade make up the total of sires, serving for fees ranging from $6 to $15.

Humberstone is a township which also neglects the breeding of horses, those raised being a very poor lot not over 1,000 lbs. in weight. Three grades and two pure-breds represent the sires, the latter being a Shire and a Percheron, the former Standard-bred, Percheron, and Hackney breeding. Fourteen dollars is the maximum fee and the minimum eight dollars.

Bertie township has three pure-bred stallions, a Belgian, a Standard-bred and a Shire, and one Standard-bred grade for service at fees from $10 to $12. Mares are an inferior lot, poor in type and quality and not exceeding 1,100 lbs. "A better class of horses is needed here" say the Inspectors.

The same remarks as to stallions and mares apply to Willoughby township, where there is the same apathy as to horse breeding as seems to prevail so generally in this district. There were only two stallions inspected here, a Percheron and a general purpose grade, with fees of $12 and $7 respectively.

A lack of good stallions and mares is also visible in Stamford township, where a Suffolk Punch and a Standard-bred are the only representative sires. Eleven and ten dollars are the fees charged.

In Crowland township the conditions warrant the Inspectors to again remark that "As in the other townships, there is very little interest taken in horse breeding." Three grades (two Percherons and a Roadster) comprise the list of sires, all being sound, but not of a high standard of quality. Mares are a very poor lot all round.

Inspectors' Remarks: "In Welland very little interest has been taken in horse breeding, as far as we could learn. Some horsemen say that some years ago Americans bought up all the best mares and took them away to the United States, leaving only a very inferior lot of mares to breed from, which, in most instances, were bred to light racing horses, which have produced a very inferior lot of stock. This section is well adapted for raising heavy and light horses, and it certainly would be of great benefit to the breeders, as well as to the horse industry if a few good stallions and a number of good mares were brought into the district."

Welland—Continued.

STALLIONS.

Breeding.	Number.	Average weight Pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee
							$
Clydesdales, Canadian-bred and Shires, Imported and Canadian (1 Clyde, 1 Shire Imported, 2 Shires Canadian-bred)	4	1,710	4	All	Fair	307	11
Percherons	2	1,650	4	All	Fair	160	13
Grades, Percheron	3	1,530	7	All	Fair	215	9
Suffolk Punch and Belgians (1 Suffolk Punch, 1 Belgian)	2	1,725	9	1	Fair	148	11
Hackneys and Grades (1 of each)	2	1,150	5	All	Fair	130	12
Standard-breds and Thoroughbreds Imported (3 Standard-breds, 1 Thoroughbred)	4	1,135	13	All	Fair	204	12
Grades, Roadster	7	1,045	6	All	Fair	177	9
Grades, Coach	2	1,150	4	All	Fair	80	7
General Purpose	2	1,200	7	All	Fair	22	7
Totals	28					1,443	

MARES.

Townships.	Number of mares bred to stallions inspected in Township.	Type.	Average weight.	Average quality.	Average age.
Wainfleet	157	General purpose	1,150	Fair	10
Pelham	417	A few heavy, mostly light	1,150	Just fair	9
Humberstone	230	Poor, light kind	1,000	Poor	10
Bertie	262	Poor, light kind	1,100	Inferior	10
Willoughby	92	Poor, light kind	1,100	Poor	9
Stamford	95	Poor, light kind	1,050	Poor	9
Crowland	190	Poor, light kind	1,100	Poor	10
Total	1,443				

Welland—Concluded.

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions..	13	909	12	859	12	1	50	11
Grade Stallions......	15	534	15	534	9	....	....	....
Totals	28	1,443	27	1,393	....	1	50	....

The Welland meeting on the evening of November 14th was not very well attended, and not much information was gleaned. The general opinion of those present appeared to be opposed to the present system of syndicating stallions. One speaker was in favor of inspection, and a few in favor of a Licensing Act. All present agreed that the horses in Monck and Welland were of a very poor type and quality, and that it would be in the best interests of the horse industry if some steps were taken by the Government to prevent some of the poorer sorts of stallions being used for breeding purposes.

LINCOLN.

One pure-bred Hackney and three unregistered sires are all the stallions of Grantham township. Twenty-five dollars is the highest and ten dollars the lowest fee. Mares are of fair average quality, but not good in type, and weigh 1,150 lbs. The Inspectors urge the introduction of one or two good sires into this township and also some good mares.

The quality of the horses in Niagara township has improved considably during the past few years, but is still far from satisfactory. There are a very few imported mares here, but the general average can only be stated as fair, and weight 1,150 lbs. There are nine stallions kept for service, including 4 Clydesdales, pure-bred, a registered Standard-bred three grades of that breeding and a Carriage grade. Stud fees are fairly good—$10 to $15. The quality of the sires averages fair.

Two grade Standard-breds and a Thoroughbred make up the sires in Louth township. This is a fruit section, and in consequence medium-sized horses are required for working in the orchards and under trees, hence, the mares are under-sized and poor, there being very few good mares found here.

Only one grade Carriage horse was inspected in Clinton township, and its fee is $12. Mares in this township also are a poor lot.

The same remarks apply to the mares in Grimsby township for the service of which there are a German Coach, a Standard-bred and a French Coach horse, a grade. All are sound and fair in conformation. Service fees are $12 to $15.

Mares are poor in type and quality in Gainsboro township, and there is room for improvement both as regards them and the stallions. At pre-

Lincoln—Continued.

sent there are four of the latter, a Percheron, a Standard-bred, a Roadster grade and a Carriage horse. The lowest fee is $5 and highest $15.

Inspectors' Remarks: "In going over Lincoln county we did not see very many heavy horses, and, as this is a great fruit district, a number of medium sized horses are used by those engaged in the business, for working among the fruit trees. We think, that, perhaps, as many horses are being bred as can be raised with profit in a section like this."

STALLIONS.

Breeding.	Number.	Average weight. Pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served	Average service fee.
Clydesdales; Imported	2	1,800	6½	All	Fair......	72	$ 12
Clydesdales, Canadian-bred and Grades (2 Canadian-bred, 1 Grade)	3	1,710	4	All ..	F'rly good	245	12
Standard-breds and Thoroughbreds (1 Standard-bred Imported, 2 Canadian-bred, 1 Thoroughbred)	4	1,150	10	3......	F'rly good	205	12
Grades, Roadster	7	1,075	8	All	Fair......	207	9
German Coach and Grades of French and English Coach (1 German Coach, 1 French Coach and 3 English Coach)...............	5	1,325	10	All	Fair......	289	11
Percheron and Carriage Grades (1 Percheron, 1 Grade)............	2	1,525	5	All	Good......	217	12
Hackneys, Canadian-bred	1	1,200	5	All	Fair......	16	25
Totals.................	24					1,251	

MARES.

Townships.	Number of mares bred to stallions inspected in Township.	Type.	Average weight. Pounds.	Average quality.	Average age.
Grantham	146	Rather light	1,150	Fair	10
Niagara	410	Rather light	1,150	Fair	9
Louth	42	Undersized	1,100	Poor	9
Gainsboro	354	Small and poor....................	1,100	Rather p'r	8
Clinton................	58	Poor and light	1,150	Poor	9
Grimsby	241	Poor and light	1,150	Poor	9
Total................	1,251				

Lincoln—Concluded.

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
Registered Stallions..	11	756	10	716	$ 15	1	40	$ 12
Grade Stallions	13	495	13	495	11	....	....	....
Totals	24	1,251	23	1,211	....	1	40	....

There were a fair number present at the meeting, held at St. Catharines, November 17th. The majority of the speakers seemed to think that something ought to be done to try to improve the present condition of the horse industry, and a motion was carried in favor of an act being passed by the Government, giving the stallion owner a lien on the mare, and also on the colt until the service fee was paid. They also passed a motion in favor of an Inspection Act, and the majority appeared to be in favor of not allowing any stallion to stand for public service that was not registered in the recognized stud book of the breed to which it belonged, one speaker stating that all horses should be put out of business which would not register, pass a proper inspection and have a license. Another speaker thought that that would be a difficult measure to put into effect in a country like this, where most men like to be their own judges. Some thought that mares should be inspected as well as stallions.

SPECIAL REPORT OF INSPECTORS.

In submitting our report, we beg leave to say that we tried to keep our own counsel on all occasions, and to gather what information we could from the owners of stallions, and others who were interested in the horse business, without influencing them in any way by expressing our own opinions. In most sections, quite a large interest was taken in the investigation by most of the stallion owners, the large majority expressing themselves very freely as being in favor of the inspection and licensing of all stallions allowed to stand for service.

We were rather surprised on some occasions to find men who were in favor of this system, whose stallions would be among the first to fall, giving us the impression that they had not given the subject that serious consideration, that in our opinion it requires.

At most of the public meetings held we found those present quite ready to express their views; but with very few exceptions the opinions offered did not appear to your Inspectors to have received that due consideration and forethought that an important matter of this kind demands. In some sections we found those who were very much opposed to inspection and also licensing, claiming that while the class of sires that is being

Report Inspectors' District 2.—Concluded.

used is not what it should be, it would be much better for the Department of Agriculture to conduct an educational campaign by the distribution of literature on horse breeding throughout the Province, through the short course in judging at the Ontario Agricultural College, the Agricultural Societies and Spring Stallion Shows; and at Farmers' Institute meetings to have up-to-date and successful horse breeders as lecturers.

We found in some sections several stallions owned by syndicates, and on inquiring as to the success of said system learned in most cases that it had not proved to be very satisfactory; in many cases it was claimed that the stallions had been put in at very much more than their actual value; and in some cases it was claimed that the horses were not breeders, and should not have been sold for that purpose. While the system on the whole appears to have given very poor satisfaction, and should not be encouraged, we think it could be adopted with advantage in some sections, if three or four good farmers would join together, have a meeting, and decide just what kind of a stallion they should have in that section; then select two good judges to purchase said stallion at a right price; get the proper guarantee and then several first-class stallions might be used where there are none at present.

We found far too many inferior sires being used throughout the district. Unfortunately many farmers look at first cost only and use these sires. We also found a large number of inferior and unsound mares which in our opinion should never be used for breeding purposes. And in consequence it is important that more educational work be taken up along this line, in order to impress breeders with the idea of using a better class of females as well as sires.

In many sections we found a large number of breeders had no fixed type, some with very good heavy mares with two or three Clydesdale or Shire crosses in them, using a Percheron or some breed of light stallion, which can only have one result, and that is to injure the horse breeding industry of the Province.

We trust that the information received from this investigation may be of value to the Department in the effort to further the horse breeding industry, one of the most important branches of live stock development in the Province at the present time, and while at nearly every public meeting the majority appeared to be in favor of inspection and licensing, as already stated, we are of the opinion that the time is not yet ripe for such legislation.

We feel that the Department might by some well directed means endeavor to educate the people, so that in the near future they may be able to see the advisability of an Inspection Act at least, and probably a license act also, and trust that the labors of the Department may accomplish the desired end.

(Signed) JOHN GARDHOUSE,
WM. CAIN.

DISTRICT NO. 3.

Counties.—Huron, Bruce and Grey.

Inspectors.—H. G. Reed, V.S., Georgetown, and Jno. Bright, Myrtle.

HURON.

The township of Stephen in Huron county is a great centre for the heavy horse industry. In the list of sires are three imported Clydesdales, and two grades of that breeding, four imported Shires, a Percheron, an imported Hackney, two Standard-breds, and a Thoroughbred. With one exception there is no unsoundness, but some are up in years. The average conformation is fair, and the percentage of foals is pretty good. Fees run as low as $8 in two cases for unregistered stock, but the general run is from $10 to $15. The draught mares in this township are of a fairly good quality, although only a small percentage of them are registered, but the average mare would be likely to produce good draught horses when mated with good draught sires. The number of mares in the township is 1,360, about three-fourths being draught, and the balance general purpose and light.

The township of Hay is one in which the Inspectors found more Shires than Clydesdales, the proportion of the former to the latter being as six to four sires. The other sires are two Percheron and four Standred-bred. All are imported, and only one case of unsoundness was found. The general average, too, is good, and service fees vary from $10 to $20. As regards mares they number 1,585, about three-fourths being heavy draught the rest general purpose and light. Their average weights are draught, 1,400 lbs.; general purpose, 1,200 lbs.; and light, 1,000 lbs., about 5 per cent. of the draughts are registered, and the balance are good draught brood mares. Only a small percentage of the light mares are really good, their average type being poor.

Tuckersmith township runs to Clydesdales, there having been no Shires brought in lately. Two pure-bred Clydesdales and one grade, and one Standard-bred and two grades constitute the sires for service, and two of these are reported as unsound. The average quality and conformation is only fair. Service fees are $10 to $20, the latter for a Standard-bred. There are about 200 heavy draught mares in the township averaging 1,500 lbs.; 195 agricultural, about 1,300 lbs., and 265 of light type, all of fair quality.

Clydesdales also predominate in McKillop township, where there are six imported Clydesdale stallions, one Shire imported, and two Standard-breds. Here, again, there is one case of unsoundness, but the average conformation is fairly good. Service fees have the usual range of $10 to $15. Out of the 640 mares 200 are heavy, 300 of the agricultural class and 140 light, the average weights being 1,500, 1,300 and 1,000 respectively.

There seems to be a larger percentage of light mares in Grey township than in those previously considered, and here the sires stand three Clydesdales, a Shire, all registered, and three Standard-breds, which include a grade. The average conformation is fair, and two are rated as unsound. Eight to fifteen dollars is the range of fees. Heavy mares number 150, *Huron*—Continued.

averaging 1,500 lbs.; agricultural are most numerous with 300, and light total 260.

In Turnbury and Morris townships the Inspectors found a large percentage of good heavy draught stallions, consisting of six imported Clydesdales and a grade, two imported Shires, and two Percherons, while the lighter breeds were represented by a Hackney and four Standard-breds, one being a grade. There is some unsoundness among both heavy and light sires, and while there are some excellent horses, including a sweepstakes winner at Toronto in 1906, the average rating is only fairly good. No service fees fall below $10, and the highest is $25 for a Standard-bred. Mares of agricultural type are most numerous, 400 in all; then come heavy mares, 395, and light, 270. The average weight are the same as given above.

Six imported Clydesdales, an imported Shire, and four Standard-breds, one a grade, make up the total of the stallions in the east part of Hullett township, and it is satisfactory to know that all are sound. Average conformation is fair, and the percentage of foals is satisfactory. Three of the sires are new arrivals, but for the others the fees are $10 to $15. In Hullett, as in the last two townships under review, the agricultural type leads among the mares, with the draught and light mares next respectively. In the west part of Hullett township heavy sires are most numerous, there being five pure-bred Clydesdales, a Shire, and three Standard-breds. In this section draught mares total 210; agricultural, 300, and those of light type, 205.

Contrary to the other townships passed in review, the township of Goderich leans more to the lighter breeds, as is seen by the fact that the light mares outnumber the draught and agricultural type, taken individually, and also by there being six Standard-bred sires and a Hackney to one Clydesdale and a Percheron. One sire is reported unsound and average quality and conformation is only fair. One grade out of the three standing for service has as low a fee as $7. The highest fee is $25.

In Colborne and Ashfield townships the Inspectors state that they found a good average lot of mares numbering, draught, 505; agricultural, 700, and light, 75, and averaging in weight as high as in the other townships; but there was a smaller percentage of really good draught stallions here than in the other parts of Huron county. There are three Clydesdales imported, one Canadian-bred, 3 grades of that breeding, four imported Shires and a grade, two Percherons, a Suffolk Punch, and a Standard-bred. There is a percentage of unsoundness, and conformation averages scarcely fair. The maximum service fee is $13 and minimum $8.

Inspectors' Remarks: "In Huron county we find the Clydesdale the popular draught horse, there being also a fair percentage of Shires and a few Percherons, one Belgian and a Suffolk Punch. The draught type of mares greatly predominates. Only a small percentage are registered, but the balance are a good average lot; there are very few really good light mares in this county.

"Our investigations have led us to conclude that very few really good mares are bred to any but Clydesdale or Shire sires.

"With regard to a Stallion Inspection Act, we find that the views of horsemen generally are that it does not go far enough. They are very much

Huron—Continued.

opposed to allowing grade or unsound stallions to be used at all. A very strong feeling prevails against the cheap, mongrel, cross-bred and grade stallions, because they interfere so much with the business of the high-class and higher priced horses. We find breeders in general very much opposed to syndicating stallions; very many poor animals are sold by this means."

STALLIONS.

Breeding.	Number.	Average weight. Pounds.	Average age.	Serviceably Sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	35	1,900	7	32	Fairly good.	3,011	13
Clydesdales, Canadian-bred	5	1,730	6	3	Fair	425	10
Grades, Clydesdale	7	1,600	5	6	Fair	431	11
Shires, Imported and Grades, (21 Imported Shires, 1 Grade)	22	1,665	5	18	Fair	2,340	11
Percherons	9	1,880	6	8	Fairly good.	840	12
Hackneys, Suffolk Punch and Grades (2 Hackneys; 1 Suffolk Punch, 1 Grade Hackney)	4	1,390	3	All	Fair	234	13
Standard-breds, Imported	19	1,110	12	17	Fair	1,504	13
Roadsters, Canadian-bred	5	1,140	9	All	Fair	280	10
Grades, Roadster	7	1,035	8	6	Fairly good.	363	10
Thoroughbreds, Canadian-bred	1	1,200	18		Fair	30	8
Totals	114					9,458	

MARES.

Townships.	Number of mares bred to stallions inspected in Township.	*Type.				Average weight. Pounds.	Average quality.	Average age.
		Heavy Draught.	General Purpose.	Agricultural.	Light.			
Stephen	1,359	935	120		305	1,200	Fair	8
Hay	1,585	1,190	170		225	1,200	Fair	8
Tuckersmith	663	200		195	265	1,250	Fair	8
McKillop	639	200		300	140	1,250	Fair	8
Grey	714	150		300	260	1,250	Fair	8
Turnberry and Morris	1,089	395		400	270	1,250	Fair	8
Hullett	1,382	520		600	355	1,250	Fair	8
Goderich	745	163		200	395	1,250	Fair	8
Colborne and Ashfield	1,282	505		700	75	1,250	Fair	8
Total	9,458							

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* The figures under this heading are only for the purpose of showing approximately the proportion of each class of mares in each township. The first column of the table gives the number of mares bred.

Huron—Concluded.

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions..	98	8,604	86	7,492	12	12	1,112	11
Grade Stallions......	16	854	14	619	9	2	235	11
Totals........	114	9,458	100	8,111	....	14	1,347	....

The public meeting for the county of Huron was held at Clinton on October 18th. Owing to the inclemency of the weather the meeting was not so largely attended as would otherwise have been the case. However, each riding in the county was represented. After about two hours' discussion on the horse question, the meeting came to the unanimous decision that some steps should be taken to prevent a grade or unsound stallion standing for service. Those present also resolved that "In the opinion of this meeting a License Act would be preferable to an Inspection Act."

BRUCE.

The townships of Kinloss and Culross in Bruce County have a number of heavy sires, there being no less than 11 imported Clydesdales, 2 Canadian-bred ones, a Belgian and a French Draught, while the only representatives of the light breeds are 2 Standard-breds. There is not a single grade horse standing for service. With three exceptions they are all sound and one of these is not now used in the stud. The Inspectors state that the Clydesdales were the best average lot they saw in their investigations. The minimum fee is $11 and maximum $16. The mares are mostly agricultural in type numbering 1,000 of this class, 730 of the draught class and 153 light. They are of fair average quality.

In the township of Carrick the inspectors found only two draught horses, a Clydesdale and a Belgian, the rest being Standard-breds, one of them a grade, and two of the sires are unsound. Eight to sixteen dollars is the range of service fees. As a matter of fact over 20 stallions, from Huron County principally, covered a part of this township, and a number of the mares credited to that county should really be included in Carrick's and Brant's list. The number of mares as given to Carrick and Brant townships is draught 166, agricultural 200, and light 187. The mares of draught type are as numerous in these townships as in any of the other townships of Bruce.

Brant township has two imported Clydedales and a grade, all sound and standing for fees as follows: grade $8, pure-breds $15.

While Eastnor and Lindsay townships have a fair percentage of heavy sires, three Clydesdales, a Shire and a Percheron, two of these of Clydesdale

Bruce—Continued.

and Shire breeding are grades, and there is also a French Canadian grade and a Standard-bred grade. All are sound except one, but the average quality and conformation is only fair, and services are given for as low a price as $5 with a general run of $9 to $15. Mares are not numerous, and are chiefly of the agricultural type and in quality poor.

No draught stallions were seen in Amabel township, sires being Standard-breds and grades, one-half being unsound. Fees range from $8 to $10. The rating is not high. There are some draught mares in Amabel township and heavy stallions come in from Grey county, and consequently will be credited to townships in Grey where these stallions came from, the Inspectors being largely dependent for their information on the stallion owners themselves.

In Saugeen and Arran townships the Clydesdale is the predominant breed, there being five imported Clydesdales, five Canadian-bred, one grade, an imported Hackney, and two registered Standard-breds. There are four cases of unsoundness, all among the heavy ones and the average merit of these is only fair. Eight to seventeen dollars is the range of the fees. As in several of the other townships the agricultural type of mare is in the majority, but there are a good many draught and some light mares.

One Clydesdale, a Hackney, a Standard-bred and two grades of that breeding constitute the list of sires in Bruce township. Here, again, was found unsoundness in the proportion of two-fifths. Conformation is good in three-fifths and very bad in the remainder. Service fees are quoted as $7, $10 and $15. Mares average about 1,250 in weight.

Kincardine township contains no less than nineteen stallions, the majority being of the heavy type. Among them are five pure-bred Clydesdales, four grades of that breeding, five Percherons and five Standard-breds, of which three are grades. The grades, as usual are the cause of service fees being put as low as $5 and $8, but the owners of pure-bred sires get from $10 to $14. The average quality and conformation is only fair. Agricultural mares again lead in number with 600, draught come next with 433, followed closely by light mares 410. The average weight is 1,250.

The four stallions inspected in Huron township were two Clydesdales, an imported and a Canadian-bred one, respectively, an imported Shire and a Percheron. One-half are reported as sound. Service fees charged are $8, $10 and $12. Out of the 430 mares in this township, 300 belong to the agricultural and 130 to the draught type.

In Greenock township there are five pure-bred Clydesdale stallions, 3 imported and 2 Canadian-bred, an imported Shire, a Standard-bred, and 2 grades of French Canadian and German Coach blood respectively. The lowest service fee is $9 and the highest $15. No less than three out of the nine are not sound, and their standard of excellence is but fair. Mares average about the same weight as in the adjoining townships, viz.—1,250 lbs., and in point of numbers they stand agricultural 500; draught 255, and light 160. Their average quality is fair.

Inspectors' Remarks: "We find in Bruce county (and especially in the Centre Riding) a larger percentage of Percheron stallions than any other district that we have visited on this commission. These horses are in a

Bruce—Continued.

number of cases "syndicated" at high prices, above what we consider their value as regards merit."

STALLIONS.

Breeding.	Number.	Average weight. Pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	27	1,850	9	21	Fair	3,013	13
Clydesdales, Canadian-bred	14	1,775	7	10	Fair	1,066	10
Grades, Clydesdale	7	1,575	8	6	Only fair	284	8
Shires, Imported and Grades (2 Shires; 1 Grade Shire)	3	1,975	6	1	Only fair	320	10
Percherons	7	1,840	6	6	Fair	595	11
Belgians	2	1,850	7	1	Poor	192	12
Hackneys, Imported and Canadian-bred (1 Imported; 1 Canadian-bred)	2	1,250	6	All	Good	170	13
Standard-breds, Imported	9	1,165	11	7	Only fair	568	10
Roadsters, Canadian-bred	2	950	3	All	Fair	35	10
Grades, Roadster	11	1,100	7	8	Fair	742	9
French Draught and Grades of German Coach and French-Canadian (1 French Draught; 1 Grade German Coach; 2 French-Canadian Grades)	4	1,525	6	All	Fair	385	11
Totals	88					7,370	

MARES.

Townships.	Number of mares bred to stallions inspected in township.	*Type.				Average weight. Pounds.	Average quality.	Average age.
		Draught.	Agricultural.	Light.	General Purpose.			
Kinloss and Culross	1,839	730	1,000	153		1,275	Fair	8
Carrick and Brant	563	166	200	187		1,250	Fair	8
Eastnor and Lindsay	348	85	200	60		1,210	Poor	9
Amabel	185			100	85	1,125	Poor	9
Saugeen and Arran	1,226	356	600	265		1,250	Fair	10
Bruce	395	50	70	245		1,125	Fair	9
Kincardine	1,471	433	600	410		1,250	Fair	9
Huron	430	130	300			1,400	Fair	9
Greenock	913	255	500	160		1,250	Fair	9
Total	7,370							

*The figures under this heading are only for the purpose of showing approximately the proportion of each class of mares in each township. The first column of the table gives the number of mares bred.

Bruce—Concluded.

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably Sound.			Not Serviceably Sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered stallions..	66	5,971	50	4,563	13	16	1,408	10
Grade stallions......	22	1,399	18	1,162	10	4	237	8
Totals	88	7,370	68	5,725	....	20	1,645	....

The public meeting for the county of Bruce was held at Paisley on Friday, November 2nd. One hundred horsemen were present, representing all parts of the county, some having driven over 30 miles to be present.

After a lengthy discussion of the horse breeding industry in general it was unanimously resolved: "That this meeting strongly approves of some drastic legislation in favor of horse breeding, and is in favor of the compulsory inspection and licensing of all stallions standing for service; requirements for license to be freedom from hereditary unsoundness, and registration in a recognized record of the Dominion of Canada and a reasonably good formation."

Coupled with the above, the meeting also voted in favor of a Lien Act, giving the stallion owner a lien on the mare and foal until the insurance was paid.

GREY.

Sires of the heavy breeds have a monopoly in Bentinck and Normanby townships in the county of Grey. In Bentinck there are just two stallions an imported Clydesdale and a Percheron, both sound, and of fair merit. Fees are $13 and $12, respectively. Normanby has three more than Bentinck to its credit, viz., four Clydesdales (of which one is a grade), and a Percheron. There is one case of unsoundness, and the standard is fair. For the grade $9 is the fee charged, but two pure-breds have even lower fees $7 and $8, while the others stand at $12 and $13. Mares are mostly of the agricultural type, with some 135 of light, and 100 of heavy draught class.

Only three stallions are located in Glenelg township, an imported Clydesdale, a Percheron and a grade Roadster. Two out of the three are sound and conformation is fair. Eight, ten and eleven dollars are the fees charged. Of the 204 mares, 130 are agricultural in type, 50 draught and 24 light, with an average weight of 1,250 lbs. and of fair quality.

In Egremont, as in the other townships of the south riding of Grey, the Inspectors found a smaller percentage of draught mares than in the other districts through which they travelled. In this township the agricultural type is strong with 700 in number, the draught type comes next with 420, followed by the light with 320. The average weight of the whole is 1,250. and they are fair in quality. The percentage, on the other hand, of heavy draught stallions is very large as compared with the light breeds, being

Grey—Continued.

fourteen to four, viz.,—eleven pure-bred Clydesdales, one grade Clydesdale, a grade Shire and a Percheron. Light breeds are represented by one imported Hackney and three grade Standard-breds. Three are unsound, and no high ratings as to conformation are given. Fees charged are all the way from $8 to $13.

With the exception of one Standard-bred, Clydesdales have a monopoly of Sullivan township. Two out of the seven stallions found here are grades and six are sound. The average conformation is fairly good. Thirteen dollars is the maximum fee charged and $7 the minimum. Out of the 430 mares here only 10 are described as of light type, 80 of the draught type, and 340 agricultural.

The proportions of the mares in Derby township are very similar to those in Sullivan, viz.,—draught 50, agricultural 200 and light 25. Three pure-bred Clydesdale stallions, all sound and of fair conformation operate in this township, one of them putting in the first season. No fee is less than $10 and $15 is the highest charged.

There are a few more light mares in Keppel township, so we find two Standard-bred stallions (one a grade), to one Clydesdale. All are rated sound and of fair conformation, and earn fees of from $10 to $12. Draught mares are not numerous, only 40 being located, while light kinds number 60 and agricultural 160.

The number and average weight of mares in Sydenham township runs as follows: 100 draught, 1,500 lbs.; 600 agricultural, 1,300 lbs.; and 270 light mares, 1,000 lbs. The Inspectors explain the large percentage of light mares in this township by the fact that in Owen Sound there are a large number of light stallions. As a matter of fact there are twelve light sires made up as follows: five registered Standard-breds and two grades of that breeding; two pure-bred Thoroughbreds, a pure-bred Hackney, and a grade, and a grade French Canadian. The heavy breeds are represented by three imported Clydesdales. Conformation is fair in all cases, but there is unsoundness in four of these animals. A Standard-bred grade is at the bottom of the list as regards fees, viz., $6, while a Thoroughbred heads it with $15.

In St. Vincent township, on the other hand, the heavy sires are the rule, almost to the exclusion of light stallions, there being only a solitary Standard-bred to five Clydesdales (one a grade), and three Percherons of which one is also a grade. Out of nine sires two are reported as not sound. For the two grades the service fees are $8 each, for the pure-breds from $10 to $15. Draught mares are given as 100, agricultural as 420 and light as 100. in this township. In average weight, quality, and age they are on a par with those in adjoining townships.

Heavy sires are also in the majority in Holland township where breeding interests are looked after by three Clydesdales, a Belgian, a Thoroughbred grade and a grade of Standard-bred stock. Nearly one-half are rated as wanting in soundness, and the average conformation is only fair. Service fees are about the same as elsewhere in this county, $8 for grade and $10 to $15, for the others. The agricultural type of mares predominates to the number of 350, light mares being next in number with 150 and draught with 120.

The proportion of light to heavy sires in Euphrasia township is as four to five consisting of two imported and one grade Hackney, a Standard-bred and three imported and one grade Clydesdale. No cases of unsoundness were reported here, but conformation is only fair. Service fees are the same as

Grey—Continued.

given for the previous township. Agricultural mares 500 in number; light 200, and draught 130, make up the total mares reported.

In Collingwood township light sires are not much in evidence, as is shown by the fact that there is only one grade Standard-bred to represent their interests, while there are five pure-bred Clydesdales. There are 200 agricultural and 100 draught mares kept in the township. The stallions have fair average conformation and all are sound, and they stand for $9 in one case and $10 in the rest.

Proton township is again a great district for the heavy breeds, of which there are the following representatives: ten Clydesdales, and a Shire, while other breeds are Thoroughbreds two, Standard-breds one and French Canadian one. All are pure-bred and all sound except one, and conformation is fair on the average. Stud fees are from $8 to $10. The mares found here are of about the usual fair quality and weight, the agricultural type leading in number with 500, draught come next with 250 and light last with 200.

Artemesia township contains a representation of several breeds varying from Clydesdale, Shire, Belgian, Hackney, French Coach, and Standard-bred, to a Shetland pony sire. While there are some good sires here there is still room for improvement, both as to conformation and soundness, no less than two-sevenths being reported as not qualifying for soundness. We find a pure-bred Clydesdale standing for $6, a grade for $8 and the balance for fees varying from $10 to $25, the latter for a Hackney. As regards purity of blood, the standing is eleven registered and three grades. Mares number 1,182, being composed of 600 of agricultural type, 382 of draught, and 200 of light mares.

STALLIONS.

Breeding.	Number.	Average weight. Pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee. $
Clydesdales, Imported	33	1,850	7	28	Fair	3,532	11
Clydesdales, Canadian-bred	23	1,630	6	20	Fair	1,341	9
Grades, Clydesdale	7	1,470	4	All	Fair	445	8
Shires, Imported	3	1,975	7	....	Fair	310	9
Percherons	5	1,820	5	All	Only fair	405	11
Percherons, Canadian-bred	1	1,600	5	All	Good	85	12
Grades, Percheron and Shire (1 Percheron, 2 Shires)	3	1,550	15	....	Poor	187	8
Hackneys, Imported	5	1,310	9	All	Fair	500	12
Grades, Hackney	2	1,250	6	All	Fair	110	9
Standard-breds, Imported	7	1,080	13	6	Fair	570	12
Roadsters, Canadian-bred	3	1,100	11	2	Fairly good	130	11
Grades, Roadster	11	1,130	8	10	Fair	510	9
Thoroughbreds, Canadian-bred	4	1,050	7	3	Fair	45	12
Grades, Thoroughbred	1	1,300	7	All	Good	100	12
French Coach, French Canadian, and Grades, (1 French Coach, 1 French Canadian, 1 Grade)	3	1,330	6	All	Fair	350	9
Belgians and Grades (2 Pure-breds 1 Grade)	3	1,875	6	1	Only fair	225	10
Shetland Pony	1	350	4	All	Fair	12	10
Totals	115					8,857	

Grey—Continued.

MARES.

Townships.	Number of mares bred to stallions inspected in township.	*Type. Heavy draught.	Agricultural.	Light.	Average weight. Pounds.	Average quality.	Average age.
Bentinck and Normanby	535	100	300	135	1,250	Fair ...	9
Glenelg	204	50	130	24	1,250	Fair ...	9
Egremont	1,498	420	700	320	1,250	Fair ...	9
Sullivan	440	80	340	10	1,250	Fair ...	9
Derby	278	50	200	25	1,250	Fair ...	9
Keppel	264	40	160	60	1,250	Fair ...	9
Sydenham	980	100	600	270	1,250	Fair ...	9
St. Vincent	640	100	420	100	1,250	Fair ...	9
Holland	620	120	350	150	1,250	Fair ...	9
Euphrasia	830	130	500	200	1,250	Fair ...	9
Collingwood	346	100	200	45	1,250	Fair ...	9
Proton	1,040	250	500	200	1,250	Fair ...	9
Artemesia	1,182	382	600	200	1,250	Fair ...	9
Total	8,857						

* The figures under this heading are only for the purpose of showing approximately the proportion of each class of mares in each township. The first column of the table gives the number of mares bred.

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions	89	7,295	74	5,892	11	15	1,403	11
Grade Stallions	26	1,562	21	1,290	9	5	272	9
Totals	115	8,857	95	7,182	....	20	1,675	....

The public meeting for the county of Grey was held at Markdale on November 15th, about one hundred being present, representing nearly every township in the county. A discussion of a most lively kind took place lasting over three hours, when the following resolutions were carried:

"That this meeting is in favor of the compulsory inspection and licensing of all stallions standing for service."

"That all unregistered stallions be prohibited from serving mares."

"That all stallions suffering from hereditary unsoundness be prohibited from serving mares."

"That a Stallion *Lien Act* be passed."

Grey—Concluded.

A very lengthy and spirited discussion took place as to the amount that should be charged as a license fee, the suggestions varying from no charge to one hundred dollars. Finally, it was decided not to offer any suggestions as to the amount of the fee, but to leave that to the consideration of the Government.

The first resolution was carried almost unanimously; many, however, were opposed to the second and third, thinking it quite impossible to carry into effect such legislation. The minority were in favor of refusing a license to undesirable stallions and letting it go at that. There was also considerable opposition to a Stallion Lien Act.

SPECIAL REPORT OF INSPECTORS.

We, your Inspectors, beg leave to report that after investigating the horse industry in the counties of Huron, Bruce, and Grey, and inspecting the stallions in the above named counties, would strongly recommend the compulsory inspection and licensing of all stallions kept for service, the requirements for licensing to be freedom from hereditary unsoundness and registration in a recognized record of the Dominion of Canada; and we would also recommend a nominal license fee, sufficient to defray expenses in connection with said inspection. In reference to the Stallion Lien Act, we do not feel like recommending the Government to pass such legislation. While we have no doubt it might be some protection to the owners of stallions, yet we feel in many cases, it would be a hardship and an encumbrance to the owners of mares, and we believe there would be a good deal of opposition from farmers generally against such an Act. While we believe that much good has and can be done by the syndicating of good horses in many sections, yet we feel that there should be some protection to the farmers against being swindled by glib tongued salesmen, who sell inferior stallions, perhaps in the best of condition, to men who are not judges of horses. We would recommend that stallions about to be syndicated be compelled to pass inspection before being offered for sale. We believe the horse industry could be greatly benefited by holding a meeting of horse breeders in each riding, to be addressed by practical up-to-date horsemen, on the kind of horses required for the market to-day, and how to breed them.

(Signed) H. G. REED.
JOHN BRIGHT.

DISTRICT NO. 4.

Counties.—Perth, Waterloo, Wellington and Dufferin.

Inspectors.—Wm. Jones, Zenda; Peter Christie, M.P., Manchester, (Perth, Waterloo, South and Centre Wellington) and John A. Boag, Ravenshoe, (East and West Wellington, and Dufferin).

PERTH.

Perth is a county in which there are a number of breeders and importers of good horses, mostly Clydesdales. There are also several Hackneys, Percherons, Belgians and Standard-breds. In Downie townships, St. Paul's is the centre of a good horse district, and there were found five Clydesdales, a Standard-bred and a grade Shire. The effect of the presence of good sires is seen in the fact that even for the grade the service fee is not lower than $10, and it ranges from $12 to $15 in the other cases. There is one instance of unsoundness. The Inspectors report of the mares found here, 345 in number, that many of them are registered and are of a good class of Clydesdale type. The good stallions kept here have been of great value to the heavy horse business in Downie. Mares average 1,400 lbs. in weight.

Blanshard is another township well known as a good horse centre, especially for heavy horses. It is gratifying to find that of the nine stallions standing for service here not one is unsound, and the average conformation is good. The majority of stallion owners charge a fee of $15, some $10, and one $20. There are five imported Clydesdales, an imported Hackney, a Percheron, and two Standard-breds. Mares in Blanshard are mostly a very good lot, especially those of the heavy class, although it is said that farmers have sold off their best mares, especially near St. Mary's. The average weight of those of heavy type is 1,400 lbs., and of light type 1,100 lbs.

While there are not quite so many stallions in Hibbert township, they are all Clydesdales, imported, of a good serviceable age, good in conformation and all sound and stand for fees ranging from $10 to $15. Mares in this township ship are, so the Inspectors report, improving in quality and conformation, quite a number of good young mares having been bred this last season. The average weight of the mares is 1,400 lbs. and their average quality is fair.

Fullarton township has had the benefit of having brought into it an excellent class of stallions, some of which are also to be found in adjoining townships, where they are doing good service. Out of the 18 stallions here, ten are Clydesdales owned by one importer and there are two imported Clydesdales besides these. There is also an imported Hackney, an imported Shire, a Hackney grade, a Percheron, a Standard-bred, and a grade of the last named breeding. All are sound and mostly good in conformation and action and with three exceptions, in which the fee is $10, the standard fee is $15. In this township farmers are breeding the heavy mares to heavy sires and light mares to light sires, not as in some other districts breeding indiscriminately. Mares are in general of Clydesdale type, and average 1,400 lbs. in weight.

Heavy sires are in the majority in Logan township as well, where there are three imported Clydesdales, a Percheron, a grade Shire and a grade Roadster, standing for service fees from $8 to $15. All horses inspected are reported sound and of good conformation. Mares are of fair quality and average in weight the same as in the other townships of Perth.

Perth—Continued.

Two imported Clydesdales, a Canadian-bred one and a Clydesdale grade, a Thoroughbred and a Standard-bred were all the sires located in South Easthope. All were sound, of good conformation and the maximum fee is $15 and the minimum $10. The mares average 1,500 lbs. in weight and are of good Clydesdale type, with an average age of six years.

In North Easthope only two imported Clydesdales and an imported Hackney were found, and the latter was not seen, owing to its owner being away. For the Clydesdales the fees were $14 and $15. There are a good lot of mares in this section mostly of Clydesdale type and averaging 1,500 lbs. in weight.

Among the sires in Ellice township are three pure-bred Clydesdales, an imported Shire, a Belgian, a Standard-bred and a grade Coach. Conformation is not so good as in the other townships visited, but all are fairly serviceably sound. Mares number some 430 of which the greater proportion are of Clydesdale type and the balance of light type. Fees vary from $10 to $16.

Mornington is a township well provided with stallions, and as far as seen they were all reported sound and of fairly good average conformation. The general run of stud fees is $10 to $16, but one is given as $40. The list includes six imported and two Canadian-bred Clydesdales. There are 1,123 mares in this township of good average weight and quality.

With seven Clydesdale stallions (one a grade), a Belgian, a Hackney, a Percheron, 2 Coach horses, and three Standard-bred grades, Elma township has a fair range of sires of various types, but there is much lacking in regard to soundness and in conformation in some cases. The stud fees range from $10 to $15. Mares are in number 1,220, each breeder keeping two on the average. The average weight of the heavy mares of Clydesdale type is about 1,400 lbs. and the light Roadster mares 1,100 lbs. The average quality is fair all round.

STALLIONS.

Breeding.	Number.	Average weight. Pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee. $
Clydesdales, Imported	42	1,860	7	All	Good	3,689	14
Clydesdales, Canadian-bred	7	1,590	6	All	Good	355	10
Grades, Clydesdale	5	1,650	9	4	Good	426	11
Shires, Imported	2	1,900	5	All	Fairly good	227	14
Grades, Shire	2	1,700	13	1	Fairly good	188	9
Percherons	4	1,750	4	All	Fairly good	295	14
Belgians	3	1,930	4	All	Fair	185	15
Hackneys and Grades (6 Hackneys, 1 grade)	7	1,235	7	All	Good	574	12
Standard-breds, Imported	8	1,060	8	All	Fairly good	434	17
Roadsters, Canadian-bred	2	1,150	9	All	Good	193	11
Grades, Roadster	7	1,010	6	5	Fair	108	10
Thoroughbreds, Imported	3	1,050	6	All	Fairly good	148	11
German Coach Horses and Grades (1 German Coach, 2 Grades)	3	1,200	17	All	Fairly good	85	10
Totals	95					6,907	

Perth—Concluded.

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average weight. Pounds.	Average quality.	Average age.
Downie	475	Clydesdale	1,400	Good	7
Blanchard	923	Clydesdale	1,400	Good	7
		Roadster	1,100	Fair	11
Hibbert	650	Clydesdale	1,400	Fair	8
Fullerton	738	Clydesdale	1,400	Fair	8
		Roadster	1,100	Not good.	10
Logan	559	Clydesdale	1,400	Fair	7
		Roadster	1,100	Fair	10
South Easthope	474	Clydesdale	1,500	Good	6
North Easthope	262	Clydesdale	1,500	Good	6
Ellice	403	Clydesdale	1,400	Fair	8
		Light	1,100	Not good.	10
Mornington	1,203	Clydesdale	1,400	Fair	7
		Light	1,100	Fair	10
Elma	1,220	Clydesdale	1,400	Fair	8
		Light	1,100	Fair	10
Total	6,907				

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions	78	6,125	78	6,125	13	....	....	....
Grade Stallions	17	782	13	641	10	4	141	11
Totals	95	6,907	91	6,766	....	4	141	....

The public meeting held at Mitchell on October 16th was well attended and discussed fully the question of an Inspection Act, and a motion favoring the same was carried unanimously at the meeting.

Many of the stallion owners suggested that if stallions were under license and stallion owners had one-third of the insurance fee down at the time of service, it would put a stop to the breeding of a lot of mares that are not likely to get in foal.

WATERLOO.

The town of Berlin was first visited. Here, and in the adjoining territory there were found two pure-bred Hackneys, two Clydesdales (one of them a grade), two Percherons, and a Coach grade. With two exceptions the standard is not high and one horse is not sound. None of the horses stand at less than $10, while the highest price is $15. There are 460 mares here, mostly general purpose and light, the general average weight of which is 1,100 lbs., and quality only fair.

Waterloo—Continued.

In Woolwich township only a Clydesdale and Standard-bred, both good in conformation and sound, stand for service at $13 and $12 respectively. They both score well and are apparently successful sires. Of the 267 mares, part are of Clydesdale blood and part of Roadster, averaging in weight respectively 1,300 and 1,100 lbs. Quality is fair and their average age is 9 years.

Wellesley township is better off as regards numbers of stallions in its borders, some of which, of course, take in other districts not so well served locally. There are six Clydesdales (one a grade), a Thoroughbred grade, two Standard-bred grades, and a Coach grade in this township. Six of these are stated to be good individuals, both as regards conformation and action. Service fees range from $10 to $15. The type of mare found is general purpose, weighing about 1,200 lbs., but quality is inferior.

Waterloo township is another well furnished with sires, ten Thoroughbreds being found in one stable. It is also favored with some Standard-bred sires of the best quality, thirteen of which, together with some good Clydesdales and Hackneys were inspected in one stable, and it is worthy of note that out of 103 animals examined there, not one was found unsound. Besides these there are in the township a pure-bred Shire, four Clydesdales (one a grade), and a Standard-bred grade. Not all are sound, but their conformation is generally fairly good. As low as $5 and from $10 to $15 are the usual service fees. In some cases, however, they are from $25 to $50. The general run of the mares in this township are of the general purpose class.

The sires represented in Wilmot township are two Clydesdales, three Percherons, a Hackney, and three Standard-breds. Two of the sires could not be seen as they were away from home when the Inspectors paid their visit. Average conformation is fair, and there is some unsoundness. Stud fees vary from $8 to $20. The mares, as in most of the townships in Waterloo, are of general purpose class and are not very good in quality.

A pure-bred and grade Clydesdale, both sound, were the only stallions seen in North Dumfries township, and the stud fee is $10 in each case. There are a few good registered Clydesdale mares owned in this township, which are dependent on outside stallions for service. Most of the mares are of the general purpose type and deficient in quality.

STALLIONS.

Breeding.	Number.	Average weight. Pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales and Shires, Imported (7 Clydesdales, 1 Shire).........	8	1,800	6	7......	Fairly good	845	13
Clydesdales, Canadian--bred.......	7	1,740	6	6......	Fairly good	473	11
Grades, Clydesdale..............	4	1,400	4	All....	Fair	155	8
Percherons	5	1,700	7	4......	Fair	290	14
Hackneys, Imported..............	3	1,300	7	2......	Fairly good	323	13
Standard-breds, Imported.........	16	1,050	6	All....	Good......	220	13
Roadsters, Canadian-bred and Grades (1 Roadster, 3 Roadster Grades, 2 Coach Grades)........	6	1,150	6	All....	Only fair..	313	11
Thoroughbreds and Grades (10 Pure-bred, 1 grade)..................	11	1,040	8	All....	Fairly good	205	14
Totals..................	60					2,824	

Waterloo—Concluded.

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average weight.	Average quality.	Average age.
Town of Berlin	460	General Purpose	1,200	Not good	8
		Light	1,000	Fair.	7
Woolwich	267	Clydesdale	1,300	Fair.	9
		Roadster	1,100	Fair.	9
Wellesley	964	General Purpose	1,200	Not good	8
Waterloo	613	General Purpose	1,200	Not good	8
		Standard-bred	1,050	Good.	8
Wilmot	422	General Purpose	1,200	Not good	8
North Dumfries	98	General Purpose	1,200	Not good	8
Total	2,824				

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
Registered Stallions	50	2,356	46	2,016	$ 13	4	340	$ 14
Grade Stallions	10	468	10	468	9	....	....	....
Totals	60	2,824	56	2,484	....	4	340	....

The public meeting for Waterloo county was held at Berlin on October 22nd, but was not very largely attended. The majority of those present were in favor of an Inspection Act.

WELLINGTON.

In the township of Guelph are four good Clydesdales, one of which is Canadian-bred, and there is a Thoroughbred sire for the light mares. No instance of unsoundness is stated, and the general conformation is good. The service fees run at about $10. There are many mares of Clydesdale breeding, more or less, and a few light ones averaging about 1,100 lbs. Quality is only fair.

Considering that there are a number of good Clydesdale stallions for service in Puslinch township the mares of heavy type in this township

Wellington—Continued.

are not as good as they might be, and one reason given is that farmers have sold their best mares. Of the 683 mares none are above medium in quality or fair in type. Of the fifteen stallions standing for service, eight are imported Clydesdales, two imported Hackneys, one a Thoroughbred, and four are Roadster grades. There is only one unsound, and some are considerably above the average stallion. Fees in general, run from $10 to $15, with one quoted at $25.

Of the stallions in Eramosa township, with few exceptions the Inspectors do not speak very highly, most of them being deficient in type and not likely to improve the class of horses found there, the mares, too, being of no special type. The sires include an imported Hackney, two Clydesdales (one a grade), two Thoroughbreds, and five Standard-breds, of which three are grades. $8, $10, $12 and $13 are some of the fees charged.

Seven stallions were inspected in Pilkington township belonging to the following breeds: Pure-bred Clydesdales, four; Standard-bred, Coach and Percheron, one each, and one Roadster grade, the latter standing at an $8 fee, the others from $10 to $15. All but one are sound, and the general average of conformation is fair, one Clydesdale being highly spoken of. The mares here are of fair average quality, those of Clydesdale breeding averaging 1,400 lbs., and light mares about 1,100.

Nichol township contains three pure-bred Clydesdale stallions, a grade Shire, and a grade Standard-bred, all qualifying as to soundness, but under the average as regards general conformation. One of the Clydesdales has only recently been brought in, and had not done any service at the time of the inspection. Ten dollars and twenty dollars are charged as fees, the latter for a heavy sire. The average of the heavy mares kept is rather higher than in other parts of the county, being 1,500 lbs., and averaging well as to quality.

While all the stallions in West Garafraxa township are pure-bred, there is some unsoundness among them, to the extent of two-sevenths. Clydesdales make up three, Standard-breds three, and there is one Percheron. There are no stud fees lower than $12, and the highest is $20. As this proportion of heavy sires would show, there are a number of fairly heavy mares in the township; also a good percentage of light ones, the respective weight averages being 1,400 to 1,100 lbs.

Of the stallions in East Garafraxa, the Inspectors state that their standard is not as good as it might be, and mares also are below the average of those in other sections of the county. It was the opinion of farmers met with here that something should be done to weed out inferior sires. The list of sires is made up of four imported and one Canadian-bred Clydesdales, and two grade Standard-breds. No less than three stallions are standing for as small a fee as $8, for the rest the fees are $10, $12 and $15. Unsoundness is again in evidence here.

In Erin township the general purpose mare is the rule, with an average weight of 1,200 lbs. The quality is poor. They total 736. The light breeds predominate among the stallions. There are three imported Clydesdales and one grade, a cross-bred Shire and Clydesdale, four pure-bred Standard-breds and a grade, and two imported Hackneys. There are two

Wellington—Continued.

cases of unsoundness, but the general average of the conformation is fairly good. Stud fees have a wide range from $6 to $20, with most of them from $10 to $12.

Mares in Luther township average 1,400 lbs. in weight for the heavy ones and 1,100 for the light. Their average quality is only fair however. The larger number of heavy mares is reflected in the proportion of heavy sires which are four Clydesdales to three Standard-breds, two of the latter being grades. All are sound and pretty fairly good in conformation and quality. The minimum stud fee is $7, the maximum $15.

Clydesdales again head the list in Arthur township, where six pure-breds of that breed and one grade, a grade Shire, a Thoroughbred, a Standard-bred, and two Roadsters make up the dozen stallions standing for service at varying fees from $6 to $15. No less than one-fourth are reported as not sound, but the average conformation is fairly good. The heavy mares found here are principally of Clydesdale blood, and average 1,400 lbs., light ones being 1,100 lbs.

There are no less than a baker's dozen of Clydesdales among the twenty stallions inspected in Minto township. The sires representing other breeds being Thoroughbreds, two; Hackneys, one; Coach grade, one; and Standard-breds, three, of which one is a grade. Four of the Clydesdales also are grades. Competition must be very keen here, for we find service fees quoted as $3 in one case and $5 in two others, but the better horses make $10 to $15. With one exception all are sound, but quality and conformation are only fair. The benefits of so many heavy sires is shown in the increase in the average weight of the heavy mares which is 1,500 lbs., and their quality is good.

There are seven Clydesdale stallions in Maryborough township, one being a grade; three pure-bred Percherons, an imported Hackney, a Thoroughbred, and a Roadster grade, and while there are a few good sires among them, the general average is not high. From $8 to $15 is earned in stud fees. Heavy mares only average 1,300 lbs.; light ones being about the same as usual, with average quality fair.

For the 618 mares in Wallace township there are four Clydesdales, a Belgian and a Standard-bred all registered and only one not sound. Conformation is only fair. Fees range from $10 to $16. The heavy mares of Clydesdale blood are of good average quality and fair weight.

Peel township, the last of the townships in Wellington to be visited, has a total of eleven stallions, made up as follows: Four Standard-breds, (two of them registered and two grades), three pure-bred Clydesdales, n imported Hackney, a Thoroughbred, and a Coach Horse. Nearly all are sound or serviceably so, and they have very fair average conformation and action. Some pure-bred sires stand at $8, while the average is $10 to $15. The average quality of both the heavy and light mares found here is described as not good, and the average weights are 1,300 and 1,100 respectively. In this township it was suggested that it would be an advantage if something could be done to secure the insurance of stallions at a lower rate than that now charged by companies engaged in this class of insurance.

Wellington—Continued.

STALLIONS.

Breeding.	Number.	Average weight. Pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, imported	47	1,735	7	44	Fairly good	4,066	12
Clydesdales, Canadian-bred	15	1,590	4	14	Fairly good	827	10
Grades, Clydesdale	8	1,450	5	7	Fair	508	7
Grades, Shire	3	1,665	8	1	Poor	220	9
Percherons	6	1,835	6	All	Fair	505	14
Hackneys, imported	8	1,240	7	All	Good	716	14
Standard-breds, imported	11	1,085	8	10	Fair	605	12
Roadsters, Canadian-bred	5	1,200	10	4	Good	394	15
Grades, Roadster	20	1,020	8	16	Fair	579	9
Thoroughbreds	6	1,060	11	4	Fair	305	10
Thoroughbreds, Canadian-bred	3	1,000	5	2	Only fair	40	10
German Coach horses, Belgians and grades of Coach (2 German Coach, 1 Belgian, 1 grade)	4	1,465	8	2	Only fair	189	10
Totals	136					8,954	

MARES.

Township.	Number of mares bred to stallions inspected in township.	Type.	Average weight.	Average quality.	Average age.
Guelph	90	Clydesdale	1,400	Fair	7
		Light	1,100	Fair	10
Puslinch	683	Fair	1,200	Medium	8
Eramosa	585	General purpose	1,200	Fair	8
		Light	1,000	Fair	10
Pilkington	434	Clydesdale	1,400	Fair	7
		Light	1,100	Fair	10
Nichol	182	Clydesdale	1,500	Good	6
		Light	1,100	Fair	10
West Garafraxa	300	Clydesdale	1,400	Fair	8
		Light	1,100	Fair	10
East Garafraxa	576	Clydesdale	1,400	Not good	8
		Light	1,100	Not good	10
Erin	736	General purpose	1,200	Poor	8
Luther	747	Clydesdale	1,400	Fair	6
		Light	1,100	Not good	10
Arthur	1,341	Clydesdale	1,400	Fair	6
		Light	1,100	Fair	10
Minto	1,162	Clydesdale	1,500	Good	6
		Light	1,100	Fair	10
Maryboro	889	Clydesdale	1,300	Fair	7
		Light	1,100	Fair	10
Wallace	618	Clydesdale	1,400	Good	6
		Light	1,100	Fair	10
Peel	611	Clydesdale	1,300	Not good	7
		Light	1,100	Not good	10
Total	8,954				

Wellington—Concluded.

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total. Number of stallions.	Total. Number of mares bred to.	Serviceably sound. Number of stallions.	Serviceably sound. Number of mares bred to.	Serviceably sound. Average fee.	Not serviceably sound. Number of stallions.	Not serviceably sound. Number of mares bred to.	Not serviceably sound. Average fee.
					$			$
Registered stallions..	104	7,632	94	7,112	12	10	520	12
Grade stallions......	32	1,322	25	997	9	7	325	7
Totals........	136	8,954	119	8,109	....	17	845	....

The meeting at Fergus for the county of Wellington was held on November 7th, when there was a very good attendance. The question of an Inspection Act was discussed by the meeting, and a motion favoring the same was carried by a two-thirds vote. The passing of a Lien Act was also discussed, and a motion in favor of it when put to the meeting was passed by a small majority.

DUFFERIN.

Melancthon township has the largest number of stallions to its credit, totalling seven Clydesdales, including two grades, two imported Hackneys, a grade Roadster, and a grade Coach horse. None of those seen were other than sound, but conformation does not average better than fair. The low service fee is again in evidence, such as $6 and $8, while the highest is $11. Not much can be said about the average quality of the mares, whether heavy or light, which average 1,300 and 1,100 lbs., respectively.

Mares in Mulmur township are mostly of the general purpose sort, are not very good in quality and average about 1,200 lbs. There are seven stallions standing for service in this section, consisting of a Canadian-bred Clydesdale and a grade, an imported Shire, a French Canadian grade, a Hackney grade, a Standard-bred grade and a Coach grade. Six-sevenths are sound, and conformation in general is fairly good, but low stud fees are the rule, the limit being $8 and $10.

Mono township has 450 mares, mostly of the general purpose type, and averaging in quality about the same as in Mulmur, and also in weight. Of the six sires in this township there are four imported horses, viz., one each of the Shire and Hackney breeds and two Clydesdales. There is also a pure-bred Coach horse and a grade Standard-bred and all are rated as sound and fair in average conformation, while service fees are from $10 to $15.

There are no more than four stallions in Amaranth township, all sound and fairly good in conformation and standing for fees running from $10 to $15 and in one instance, a Standard-bred, for $25. The list comprises an imported Clydesdale, two Standard-breds and a Percheron. As in the sister townships mares are general purpose in type and not good in quality.

Dufferin—Continued.

STALLIONS.

Breeding.	Number.	Average weight. Pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	6	1,880	7	All....	Fair........	660	12
Clydesdales, Canadian-bred........	3	1,530	4	All....	Fair........	235	10
Grades, Clydesdale...............	3	1,450	5	All....	Fair........	118	7
Shires and Percherons (2 Shires, 1 Percheron)....................	3	1,925	5	All....	Fairly good.	260	10
Hackneys, Imported and grades (3 pure-breds, 1 grade)............	4	1,250	5	All....	Fair........	320	9
Standard-breds, Imported.........	1	1,100	7	All....	Good.......	78	25
Roadsters, Canadian-bred..........	1	1,100	3	All....	Good.......	21	15
Grades, Roadster..................	3	1,110	9	All....	Fair........	135	9
Coach Horses, grades of same and of French (1 Coach Horse, 3 grades)	4	1,350	11	3......	Fair........	215	11
Totals................	28					2,042	

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average weight.	Average quality.	Average age.
Melancthon.	830	Clydesdale........................	1,300	Not good	6
		Light..............................	1,100	Poor	10
Mulmur	493	General Purpose	1,200	Not good	8
Mono....................	450	General Purpose	1,200	Not good	8
Amaranth	269	General Purpose	1,200	Not good	8
Total	2,042				

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions..	18	1,604	18	1,604	13	....	....	....
Grade Stallions......	10	438	9	403	8	1	35	10
Totals	28	2,042	27	2,007	....	1	35	....

Dufferin—Concluded.

The public meeting for the county of Dufferin at Shelburne, on November 12th, was well attended, about 40 being present, mostly farmers who did not own stallions. The question of an Inspection Act was discussed by them for some time before a vote was taken. The result was that only two voted against an Inspection Act, the rest voting in favor of it.

SPECIAL REPORT OF INSPECTORS.

We the undersigned committee appointed by the Ontario Department of Agriculture for the purpose of investigating the horse industry in the district known as No. 4, composed of the counties of Perth, Waterloo, Wellington, and Dufferin, beg to report as follows: "That we have inspected 306 stallions, Clydesdales 130, Standard-breds 40, Hackney 20, Thoroughbreds 22, Percherons 17, Shires 5, Belgians 4, Coach horses 4, and grades 64. Of the pure-bred stallions we found 15 unsound horses. We found the stallions of Clydesdale blood a good lot, the mares as a rule not nearly so good, owing to what the breeders say throughout the district, that until just recently the farmers have, as a rule, sold quite a number of their best mares, and in this way have lowered the standard of the heavy mares in the district. We find, however, that this policy has been to a great extent discontinued. We also find among the heavy class of horses in this district that the Percheron stallions, the Belgian stallions, and the Shire stallions are not nearly as good a lot as the Clydesdales; in fact, they were, with one or two exceptions, poor representatives of the respective breeds.

The Percheron and Belgian horses in this district have only been introduced recently. With few exceptions these horses have been brought in and sold to from six to fifteen individuals, in most cases farmers, under a system known as syndicating, and in every instance at prices away above their value. We found the universal opinion of those we came in contact with opposed to this system. The reason assigned was that it invariably places a poor horse in a community at a very high price, and further that it introduces a breed of horses in a section quite frequently that has a tendency to impair rather than improve present conditions. For instance, in this district the heavy class of mares are almost without exception Clydesdale-bred mares of from one to three crosses, and no greater mistake could be made than to breed such mares to either Percheron or Belgian stallions.

The light horses in this district are not so numerous and with few exceptions are not of nearly so high a standard. The Hackneys, as a rule, are a very good lot of the right kind. We also find some excellent Standard-breds, but the greater part of them are very inferior individuals. The grades are far too numerous, and, in most cases are of a very poor class, which would scarcely make good-looking workers.

Your committee are of the opinion, from what they learned and observed in passing through the district, that the heavy horse can be raised most profitably in this district. From the information we received we are convinced that there is no other plan of ownership of stallions that is giving as much satisfaction as private ownership.

We find that the views of horsemen generally favor a stallion Inspection Act with license attached that would permit of only pure-bred horses with registered pedigrees, free from all hereditary unsoundness and of reasonable

Report Inspectors' District 4.—Concluded.

merit standing for service. We also found that the farmers we came in contact with view this with favor, and we are of the opinion that this would be the most effective way of materially improving the class of horses in this district. We arrive at that conclusion for different reasons. In the first place it would weed out largely the undesirable sires which in this district amount of twenty-five per cent. of the whole. In the second place it would to a considerable extent prevent the breeding of these poorest mares that have been bred to these very poor stallions. We also believe that it would prevent to a large extent the importation of horses of an inferior class of any breed into this country. It would also put a stop to a system which has been pursued, and is still in practice in this country, that of selling and taking back and reselling again stallions that are known to be unsuccessful sires. But while we are convinced that an Inspection Act with license attached would without doubt very materially improve all classes of horses in this district, we are of the opinion that legislation along that line should be deferred until the people have had ample time to be better informed on the subject. and with that object in view we would suggest that the Department of Agriculture should by some well directed course endeavor to enlighten the people thoroughly on this question by disseminating information bearing on the subject, and by holding a series of meetings especially called for that purpose, and that an Inspection Act be passed making it compulsory for all stallions to be inspected, and that all stallions inspected be graded according to merit and breeding, with provisions attached that all stallion owners be compelled to give publicity to the certificates given. This conclusion is arrived at taking for granted that the conditions and feelings of the people are the same in other districts of this Province as in the districts visited by ourselves.

(Signed) PETER CHRISTIE.
WM. JONES
JOHN A. BOAG.

DISTRICT NO. 5.

Counties.—Peel, Simcoe, York and Ontario.

Inspectors.—Thos. McMillan, Seaforth; and Wm. Mossip, St. Mary's.

PEEL.

While some of the townships in Peel county have a good proportion of heavy stallions, Brampton is a town that has long been known as a centre for carriage and saddle horses, especially the former, Hackney sires having been used here for some years, and also Thoroughbreds. The list includes four Hackneys, a Thoroughbred, a Clydesdale, and a Percheron. Some of the stallions are rather up in years, but all are sound, and the average conformation is certainly good. In one case the service fee is $12, while the fee for the other is $15. There are quite a number of pure-bred Clydesdales in this neighborhood, and their average quality and that of the light mares is very good. No breeding of old, unsound mares is reported.

The farmers in Chinguacousy township are taking an interest in horse breeding, but a good many light mares are being bred to heavy stallions in the neighborhood of Mono Road. The general type of the heavier mares is of the agricultural or general purpose class, ranging from 1,250 to 1,350 lbs. in weight. No less than eight pure-bred and two grade Clydesdale stallions stand for service here, one of the grades being a cross with a Shire. Besides these there are a Thoroughbred and three Roadsters, pure-bred and grades. The majority are sound and good in conformation. Stud fees are low, no less than five standing for fees of $8 each; for the rest the fees are $10 to $15.

Toronto township is well provided with sires, there being no less than eighteen here, among which are five Clydesdales (one a grade), two Shires, a Percheron, two Thoroughbreds (one a grade), a Cleveland Bay grade, a Hackney and the balance Standard-breds and Roadsters. There was some unsoundness, but on the whole the conformation was good. The range of stud fees was from $10 to $20. The Inspectors report that most of the stallions are not given sufficient exercise. There are a good many imported Clydesdale mares in this township but no Shire mares. There are also some good carriage mares. The general average weight of mares is 1,350 lbs.

In Toronto Gore there were just two stallions inspected, a Canadian-bred Clydesdale and a Hackney grade, by a Hackney sire out of a Standard-bred mare. Both are sound and the fees are $8 and $10. Mares here average 1,500 lbs., and are good in quality and the heavy mares good in type. There is very little or no breeding of old mares.

The stallions in Albion township are not as a rule of very good type or conformation. The service fees average $10. The breeds represented are two Standard-breds, two grade and one pure-bred Clydesdale, and a French Canadian. Three of these horses do not travel, but stand for service at home. The mares found here are a good class, good in type and quality, and average 1,400 lbs.

Bolton township has seven imported Percherons. These horses are all a very good class, and if bred to suitable mares would do good service. It is doubtful, however, the Inspectors report, if crossing them on mares with Clydesdale blood would be advisable. Besides the Percherons, there are an imported Hackney, an imported and a Canadian-bred Clydesdale, and also

Peel—Continued.

a Canadian-bred Shire. All are sound and of good conformation; the average service fee is about $11. There are a number of mares of fair quality, and good type in this township scaling about 1,350 lbs.

There are seven stallions in Caledon township, made up as follows: an imported Hackney that was syndicated for $2,400, three Clydesdales, a Clydesdale-Shire cross, a grade Belgian, and a grade French Canadian. While mostly sound their average conformation is not high. They stand at fees varying from $8 to $15. Mares are only fair and their average weight is not over 1,300 lbs.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	12	1,745	6½	10	Fairly good	868	11
Clydesdales, Canadian-bred	8	1,585	6	7	Fairly good	517	9
Grades, Clydesdale	6	1,430	5	All	Fairly good	188	8
Shires	3	1,465	2	All	Fairly good	71	10
Percherons	9	1,670	4	All	Good	72	13
Hackneys, Imported	7	1,280	10	All	Good	485	15
Grades, Hackney and Belgian (1 Hackney, 1 Belgian)	2	1,250	5	All	Good	16	9
Standard-breds, Imported	4	1,085	8	All	Good	147	15
Roadsters, Canadian-bred	2	1,125	7	1	Fairly good	224	10
Grades, Roadster	5	1,080	8	All	Fairly good	170	9
Thoroughbreds	3	1,170	6	All	Good	20	13
Grades, Thoroughbred and Cleveland Bay (1 of each)	2	1,185	12	All	Good	110	11
Grades, French Canadian	2	1,275	15	All	Fair	70	....
Totals	65					2,958	

MARES.

Townships.	Number bred to stallions inspected in township.	Type.	Average weight, pounds.	Average quality.	Average age.
Brampton Town	574	Good. Quite a number of pure-bred Clydesdales	1,400	Very good	6
Chinguacousy	545	General Purpose and Agricultural, and some light	1,300	Good	7
Toronto	613	Fair	1,350	Fair	7
Toronto Gore	16	Clydesdales; light	1,500	Good	6
Albion	364	Good	1,400	Good	8
Bolton	220	Good	......	Fair	8
Caledon	626	Fair	1,300	Fair	8
Total	2,958				

Peel—Concluded.

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions .	48	2,404	44	2,073	12	4	331	10
Grade Stallions	17	554	17	554	9	....	....	....
Totals	65	2,958	61	2,627	21	4	331	....

At the meeting held at Brampton for the county of Peel, the speakers were generally in favor of an Inspection Act for stallions, and one speaker went further and thought that it should include an inspection of the progeny, and, if these proved inferior, to cancel the sire's license. Much better results were obtained from the importation from Great Britain than from those from the United States, as regards the light classes. Another gentleman found that little confidence could be placed on the pedigrees of the light horses as furnished by owners. Nothing beneficial would follow inspection of the dams. If any system could be devised whereby stallions could be restricted to a certain number of mares it should be done. It was also thought by another speaker that the breeding of heavy horses was the most profitable for the farmer. He would encourage the crossing of Clydesdales and Shires. Another gentleman considered the breeding of speedy horses in Peel an ignominious failure, on the testimony of a light horse breeder. Another gentleman also spoke very strongly against syndicating, of which he had had bitter experience, some one always being given a good sum of money to put the deal through.

SIMCOE.

In Essa township honors are divided, there being three each of Clydesdales and Standard-breds, and only one grade, belonging to the latter. Two-thirds of them are sound, and the general average conformation is good. The fees charged run from $10 to $15. Mares average from 1,200 to 1,300 lbs., and the average kept is 1½ by each breeder.

Tecumseth township has three pure-bred Clydesdales, four grades of more or less Clydesdale breeding, a Percheron, a German Coach horse, and a Roadster grade. With one or two notable exceptions they are not of a very high order, although several qualify as regards conformation, but not all as to soundness. A minimum of $5 and a maximum of $15 is the range of the stud fees. The mares in this township are rather inclined to the light type, the heaviest averaging about 1,300 lbs. and the light about 1,175. They are of a fairly good type. The general opinion of the farmers seemed to be that syndicating stallions was a great mistake, for by this means the stallion costs nearly double what it should, and as in most cases there is no one whose special business it is to look after the stallion, in most cases it is

Simcoe—Continued.

not properly taken care of. Those spoken to thought that it would be a good thing to inspect stallions and also thought that they were not given enough exercise at this season of the year (October).

Clydesdales lead in point of numbers in Gwillimbury, with six pure-breds and two grades; Percherons, Roadsters, and Shires have one each to their credit. Two, at least, of the stallions are too old for service. There is not much unsoundness, but average conformation is only medium. $6, $8, $13, and $15 are fees charged. Mares are only medium heavy and fair in quality.

Adjala township has a Canadian-bred Clydesdale not registered and a grade Roadster, the latter well up in years. No unsoundness is mentioned and conformation is good. $10 is the fee in both cases. Mares average about the same as in the previous township, viz., 1,300 lbs.

Only one stallion, a Thoroughbred, was inspected in Innisfil township. Service fee is $10.

In Alliston town and surrounding district, quite a few old mares are being bred that are not fit for this purpose. Mares are of fair type, weighing 1,300 lbs. About one-half of the foals here die shortly after birth, and there is a good deal of "*navel and joint ailment.*" "Something should be done to prevent horses without a pedigree from travelling for service," say those who were interviewed. There are two pure-bred Clydesdales and one Standard-bred in this township, all getting up in years, fairly good in conformation, but not all sound. $10 and $12 are the fees in this section.

Tossorontio township runs exclusively to Clydesdales of which two are imported, one Canadian-bred, and two grades. The stud fees are $5, $8, $10, and $13. In consequence of the absence of light sires, many small mares are being bred to heavy horses, making a rather violent cross. Mares average in weight 1,100 to 1,200 lbs.

In the township of Nottawasaga, which includes the town of Collingwood, and village of Creemore, there are a large number of sires, including many Standard-breds and a Hackney, besides a good complement of Clydesdales and two Percherons. Of Clydesdales there are eight pure-bred and one unregistered, and of Standard-breds seven. The greater number are sound and there are some good ones among them, the average conformation being good. Starting with $8 for a grade, the fees run up to $15. In this section the Inspectors saw more mares weighing 1,300 to 1,400 lbs., than in the districts previously visited.

In Stayner town and neighborhood Clydesdales again lead with four stallions, Standard-breds having two, and there is also a grade Hackney. Two of the horses are quite aged but all are sound and all fairly good as regards conformation. There is a unanimity as to fees, all charging $10.

The town of Barrie is a fairly good horse breeding centre, sires of light breeds being most in evidence. There are five Standard-breds and a Hackney grade to five Clydesdales (one a grade). Two of the Clydesdales and one of the Standard-breds are new arrivals. There is more or less unsoundness in evidence. Stud fees range from $9 to $15. Mares average about as in other townships of this county, viz.. 1,300 lbs.

There are seven Clydesdales (of which two are grades), a pure-bred Shire, an imported Hackney and a Roadster grade in Flos township. The average conformation of the lot is good, but there are two cases of unsoundness. Stud fees reach $16 and are as low as $8. There are some good mares in this township including some excellent Clydesdale imported ones, but the general average is not above 1,300 lbs.

Simcoe—Continued.

With one exception all the stallions in Tiny township are sound and of fairly good conformation. With reference to two grades, however, their value as sires is not great. There are two Clydesdale grades and one Roadster grade, whilst the pure-breds are repesented by two Standard-breds and a French Canadian, the latter standing for a fee of $12, while the others have fees up to $10 and as low as $7. Mares are poor in quality and of poor type, and a good many old used up mares are being bred. Two stallion owners gave their views on licensing stallions. One was strongly against inspection as he stated that he could raise better grades than pure-breds. The other was in favor of inspection, as that would give the owners of good pure-bred stallions a chance to earn something on their investment.

In Tay township one stallion was not seen on account of its owner being away. Of the six inspected, there are one imported Clydesdale, two grade Clydesdales, two cross-bred Clydesdales and Shires, and a French Canadian grade. The average standard is not as good as it might be although all those inspected were sound. The maximum fee is $10 and the minimum $5. Mares are in quality poor to fair, with an average weight of 1,200 to 1,250 lbs. Too many old mares are being bred, while any good ones are being sold to too great an extent. One breeder in this township, while in favor of government inspection and licensing stallions, thinks that this should be done gradually, as it would be a mistake to cut off unregistered sires immediately, the effect being to create a great dearth of sires from which to breed. He also thought the present custom of syndicating stallions should be discouraged. A man who sells a horse in this way generally gets three or four times as much as the horse was worth. He did not think that owners of good horses should be put to the additional expense of a license.

In Vespra township only two stallions were inspected, a pure-bred Clydesdale and a grade of mixed breeding. No unsoundness is reported, and while not of a high average, their conformation is fair. Fees are $12 and $8 respectively. The Inspectors add that the cutting off of poor stallions in a district like this should not be done hastily, as farmers here will not pay a fair fee for a good horse. The result would be to leave a section like this without any sires. Mares are poor in quality and type not averaging above 1,100 lbs., and too many culls are being bred.

The four sires in Medonte township are all more or less up in years, and have been good in their day and are all still sound. They consist of a pure-bred and a grade Clydesdale, an imported Shire, and a pure-bred Standard-bred. Three of the horses stand for a fee of $8, and the fourth for $12. As in the previously inspected townships of Simcoe county a good many old mares are bred, and the good ones sold. The quality on the average is poor, and mares are of no particular type. Their average weight is 1,200 lbs.

In Orillia township there are two pure-bred imported Clydesdales, four pure-bred Standard-breds, an imported Hackney and a Percheron, all sound as far as seen, one owner having refused to allow his horse to be inspected. In general, conformation was good. Two of the stallions were syndicated at high figures. Ten and twelve dollars are paid for stud fees. Here again the report mentions that many old mares are being bred, and as the average quality is poor even of the younger mares the results of breeding old, broken-down mares must be disastrous. Horse owners here agree that some steps should be taken to do away with scrub sires.

The Township of Oro is a good breeding centre; among the stallions were some of the best horses inspected. There is, however, some unsoundness. and, while some are extra good, others are only fair, and some unfit for use.

Simcoe—Continued.

There are four pure-bred Clydesdales and a grade, a cross-bred Clydesdale and Shire, a Percheron and a grade, and a Hackney. A grade stands for a $9 fee, but the stud fees for the others range from $12 to $15. There are some good Clydesdale mares here, and the average quality and type among all mares is good. The average weight is 1,300 lbs. There is not much mortality among foals.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
Clydesdales, Imported	33	1,660	7	30	Very fairly good	3,084	$12
Clydesdales, Canadian-bred	16	1,390	5	All.	Good	841	11
Grades, Clydesdale	21	1,430	5	20	Fairly good.	1,036	8
Shires, Imported	3	1,680	11	2	Fair	341	11
Percherons and Grades (6 pure-bred, 1 grade)	7	1,780	4	5	Fair	418	12
Hackneys, Imported	4	1,220	6	All.	Good	335	12
Grades, Hackney	2	1,200	5½	All.	Fair	137	10
Standard-breds, Imported	14	1,165	10	12	Fairly good.	939	11
Roadsters, Canadian-bred	10	1,100	8	All.	Fairly good.	467	10
Grades, Roadster	6	1,190	11	5	Good	153	9
German Coach, Thoroughbred, French-Canadian and Grades (1 of each)	4	1,430	9	All.	Fair	342	11
Totals	120					8,093	

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average weight, pounds.	Average quality.
Essa	420	General Purpose to Medium draught	1,200 to 1,300	....
Tecumseth	619	Fairly good	1,175 to 1,300	Fair.
W. Gwillimbury	434	Fair	1,300	Fair.
Adjala	60	Fair	1,300	Fair.
Innisfil	25	Fair	....	Fair.
Alliston Town	279	Fair	1,300	Fair.
Tossorontio	190	Fair	1,100 to 1,200	Fair.
Nottawassaga and Collingwood Town	1,652	Fair	1,200 to 1,300	Fair.
Stayner Town	608	Fair	1,300	Fair.
Barrie Town	419	Fair	1,300	Fair.
Flos	835	A few good Clydesdales, the rest fair	1,300	Fair.
Tiny	249	Poor	1,150	Poor.
Tay	607	Poor	1,200 to 1,250	Poor to fair.
Vespra	....	Fair	1,100	Poor.
Medonte	405	Only Medium	1,200	Rather poor
Orillia	511	Only fair	1,150 to 1,200	Poor.
Oro	780	Good	1,300	Good.
Total	8,093			

Simcoe—Concluded.

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions..	89	6,615	81	5,991	15	8	624	11
Grade Stallions......	31	1,478	29	1,413	9	2	65	9
Totals	120	8,093	110	7,404	....	10	689	....

The public meeting for the county of Simcoe was held at Barrie, on October 26th. Some of the speakers took the ground that syndicating horses should be encouraged, providing it is properly done and a good caretaker employed. Some of the views expressed by those present are as follows: Syndicating is a benefit if properly done otherwise it is an injury. Offspring should also be inspected, and future licensing based upon that. It is a question whether the people would stand the licensing and the consequent cutting off of poor sires. In syndicating, a syndicate should be formed first and then the animal afterwards purchased. If animals do not pass inspection they should not be allowed to stand for service at all. A small fee should be paid for license. It would be a great hardship to bring a license act into force if there was not enough serviceable animals on hand to do the work of service. Do not bring such an act into force at once. The heavy horse is the more profitable to breed but we have use for all classes of horses. The Government should do nothing to curtail the personal liberty of the individual. No horse should be licensed unless registered in some recognized Stud book. Unlicensed animals should not be allowed to stand for service. To make it illegal to allow the owners of scrub sires to charge a service fee would not be effective. Something should be done by the Government in preventing poor sires which are registered from entering the country. An inspection and license act should extend to imported stock at the time of landing. In the syndicating or selling of stallions the law should stipulate that notes taken in the sale of stallions should have written across the face of them *"Stallion sale notes not negotiable."* This would protect the purchaser in case the animal does not come up to any guarantee which may be given. If the notes do not bear this mark they should become void and the salesman liable to a fine or penalty.

At the conclusion of the meeting a vote of the audience numbering twenty-six was taken as to the advisability of the Government passing a Stallion Inspection and License Act and the voice of the meeting was unanimous in supporting such a measure. It was also considered that it would be a benefit to encourage Agricultural Societies to choose a good sire for the season, grant the owner a premium and restrict the horse to the service of a certain number of mares.

York.

The township of King, and Newmarket have a fairly long list of sixteen stallions to their credit, consisting of twelve Clydesdales, imported and Canadian-bred; two grade French Canadians, and a Standard-bred, and a Standard-bred grade. These are all of good serviceable age and mostly serviceably sound. Their average conformation is fairly good, and most of them serve successfully a good number of mares at fees from $7 to $13. There are not very many good mares in this section; their weight runs from about 1,100 to 1,250 lbs.

In the Gwillimbury townships there are a number of good sires, including five lately imported. One horse is pretty well up in years, but has been a good stud horse, and holds his age well. There is no unsoundness among any of them. As regards breeds, there are ten registered Clydesdales, a horse of mixed Clydesdale and Shire breeding, a Shire, a Hackney, a Percheron, a French grade and a Roadster grade. Five of the stallions are not rated high and the service fees are as low as $7 and from that amount up to $15. Some of the stallions are not kept in very good shape. There are a few good imported Clydesdale females which should be of benefit to the country, but the farmers as a rule have sold all their best females and kept the poorer ones for work and breeding. The average weight of the mares is not above 1,200 lbs.

In Sutton township a good many foals died of joint disease and rheumatism last season, due a good deal to lack of care on the part of the owners. There are eleven stallions in this district, and some of them certainly should not be used for breeding purposes. The majority are of the light type, Standard-breds and grades of this breeding; in addition there are three Clydesdales. Some idea of the class of sire may be gleaned from the fact that in one case the stud fee is $3, in another $5, and $7, $8, and $10. Mares average in weight 1,250 lbs., and are only fair in quality.

In Markham township both heavy and light stallions are almost without exception good individuals. There are thirteen Clydesdales, all pure-bred, two good Hackneys, a Percheron, and two very good Roadsters out of four (one a grade). Three of the stallions are getting up in years, but with one exception and one not seen, all are sound, and average well in conformation and fair in action. Stud fees are in the majority of cases from $12 to $15, but one Hackney stands for only $8. There are some good Hackney mares here, and the average quality of all the mares is above the general average. Too many old ones, however, are being bred. The average weight is 1,400 lbs.

The three sires in Scarboro township are an imported Clydesdale, an excellent Hackney, and a Standard-bred, the latter not being seen. Both the Clydesdale and the Hackney are doing good service. The fees are $15 and $20 respectively. Mares are of a fair type and their average quality is good.

In Whitchurch township, one importer has the field all to himself and two young imported Clydesdale stallions were inspected. The latter had just arrived when the inspection was made. The average quality of farm mares is good in this township, and they are of a good type, and are bred at a suitable age.

The stallion list in the township of York, is considerably augumented from time to time by the importation of Clydesdales, Shires, Hackneys, and Percherons. In all, there are six Thoroughbred stallions, twenty-two

York—Continued.

Clydesdales, five Shires, three Percherons, eight Hackneys and a Standard-bred. Where so many horses are imported for sale and newly arrived, they do not, as a rule, stand for service. and consequently no stud fees are available. For those in service fees run from $10 to $20. The mares in this township are mostly of pretty good type and quality, averaging about 1,400 lbs.

Vaughan township has a fairly good lot of sires, which include four Canadian-bred Clydesdales and a grade of that breeding, two Percherons (one syndicated at a high figure), and a grade each of Roadster and Carriage breeding. All are eligible as regards soundness and their conformation is pretty good on the average. While some of the grades stand at $8, the better horses make from $10 to $14. The mares here average the same as in York, and are much the same in type and quality which is good. There is no breeding of old mares, as a rule.

Etobicoke township, the last in York county to be visited, has just four sires within its limits, three of them Clydesdales, and one a grade Roadster. With one exception all are sound and fairly good as to conformation. Ten to thirteen dollars are the fees charged. Mares are good, and average well in type, with a weight of some 1,400 lbs. There are many young ones among them. In commenting on the stallions in this county the Inspectors remark on a defect found largely among Canadian-bred stallions of having rather small straight hoofs.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	50	1,745	5	48	Good	2,551	12
Clydesdales, Canadian-bred	20	1,600	5	19	Fairly good	1,162	10
Grades, Clydesdale	2	1,550	4½	All	Fairly good	176	8
Shires, (5 Imported; 1 Canadian-bred)	6	1,645	5	5	Fair	215	12
Percherons	7	1,745	5	6	Fair	273	13
Hackneys, Imported	12	1,040	4	All	Good	410	13
Standard-breds, Imported	5	1,090	12	All	Fairly good	374	11
Roadsters, Canadian-bred	5	1,080	7	All	Good	178	11
Grades, Roadster	8	1,160	9	All	Fair	270	10
Thoroughbreds	6	....	10	All	Fairly good	....	......
Grades, Coach and French-Canadian (1 Coach; 3 French Canadians)	4	1,400	8	3	Fairly good	458	10
Unenumerated	9						
Totals	134					6,067	

York—Concluded.

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average weight, pounds.	Average quality.
King and Newmarket	1,261	Fair	1,100 to 1,250	Fair
E. and N. Gwillimbury	964	Fair	1,200	Fair
Sutton	427	Fair	1,250	Fair
Markham	1,478	Good	1,400	Good
Scarboro	320	Fair	1,350	Good
Whitchurch	....	Good	1,400	Good
York	492	Good	1,400	Good
Vaughan	639	Good	1,400	Good
Etobicoke	486	Good	1,400	Good
Total	6,067			

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Nnmber of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions	111	5,163	106	4,793	11	5	370	10
Grade Stallions	14	904	13	788	9	1	116	12
Unenumerated	9	....	....	....	....	....	....	....
Totals	134	6,067	119	5,581	....	6	486	....

The meeting for the County of York was held at Richmond Hill, November 5th.

There were about thirty present, and it was not such a representative meeting of those interested in horse breeding as some previously held. It was urged by some speakers that the Government should do something to protect owners of good horses. Others took the ground that that would be a hard thing to get at, as the breeding of good horses depended on the class of mares in the county as well as on the stallions. One gentleman suggested that the Government might do something towards improving the standard of the mares by giving assistance to those bringing in good mares into the country. Regarding the inspection and licensing of stallions, he thought that nothing hasty should be done, as importers were doing their best in bringing in good sires, but he thought that an act should be passed to prevent grade sires being used.

All present agreed that the Government should take steps to prevent grade sires travelling and standing for service.

ONTARIO.

Uxbridge is a township where light sires are in majority. There are five Standard-breds and a French Canadian, to one Percheron and three Clydesdales. All are pure-bred as far as seen, and mostly sound, with good average conformation. There are no stud fees lower than $10, while the highest is $15 in three instances. Mares are good in type and fair in quality, averaging 1,250 to 1,300 lbs. in weight. No old mares are bred, and there is very little foal mortality in this section.

In Scott township there was only one sire inspected, a Thoroughbred, of fair type and sound, standing at $12. Mares in this township are much the same as in Uxbridge, but with an average of only one to each breeder.

Reach is a large township, and has a fair proportion of stallions, consisting of nine Clydesdales, a cross-bred Clydesdale and Shire, a Thoroughbred, and two Standard-breds (one of the latter a grade). All but one were serviceably sound, and they are in general a pretty good lot. Ten to thirteen dollars are charged for fees, but there is one grade standing for $6. The Thoroughbred is an old Queen's Plate winner, now well up in years. The average number of mares kept by farmers is 1½, and they are good in quality and of nice type, with an average weight of 1,300 lbs.

Brock township inclines mostly to heavy sires, there being six Clydesdales to two Standard-breds. In some cases the horses are not as well looked after as they should be, and three of them are getting on in years. They are nearly all (as far as inspected) serviceably sound, and of quite good average conformation. None are grades, but some of the service fees are quite as low as if they had been, viz., $8 and $9. The majority, however, run from $10 to $15.

In Thorah township, four Clydesdales, one Shire, and one Hackney were inspected. The minimum fee is $12, and the maximum $17. In this township there is an improvement in the average weight of mares, and also in their type and quality. Some horsemen here were of the opinion that little could be done to improve the standard of horses by licensing sires.

Four stallions, all Clydesdales have their routes in Mara township, one of these is a very old horse. The other three are sound and of good conformation, with fees of from $10 to $14. The average weight of the mares is 1,400 lbs., and they are of good average quality. Farmers here are well posted as to the injury that would be done by allowing scrub stallions to serve mares.

With the exception of one registered Standard-bred and two nondescripts, all the stallions inspected in East and West Whitby townships were Clydesdales, and they number 25, the list being largely made up of the horses in the stables of breeders and importers. The stallions throughout this township are almost without exception sound, and of a class to improve the standard of heavy horses in the Province. Eliminating the horses which stand for $8 each, the horses travelling in this district have service fees of from $10 to $15, and $25 in one instance for a Standard-bred. There are a good lot of mares, in weight 1,400 lbs., and of good Clydesdale character.

The number of stallions in Pickering township is 43, of which 26 are Clydesdales, 14 Hackneys and Hackney ponies, and three Standard-breds (two of these being grades). Many of these are for sale, and are not standing for regular service, but those that do, earn service fees of from $10 to $20. The general average is naturally good, and soundness is the rule. The mares in this township are a good lot, having an average weight of 1,400 lbs., and in type favoring the Clydesdale.

Ontario—Continued.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	55	1,655	5	54	Fairly good.	2,904	13
Clydesdales, Canadian-bred, and Grades (22 pure-breds, 1 grade)	23	1,575	4	All	Good	805	10
Shires and Percherons (1 Shire, 1 Percheron)	2	1,900	7	1	Good	160	13
Hackneys	15	1,225	7	All	Good	80	14
Standard-breds, Imported	7	1,140	9	All	Good	368	15
Roadsters, Canadian-bred	3	1,075	5	All	Good	130	11
Grades, Roadster	3	1,125	11	All	Fair	162	8
Thoroughbreds	2	1,050	12	All	Fair	129	12
Grades	3		9	All		237	9
Totals	113					4,975	

MARES.

Townships.	Number of mares bred to stallions inspected in township	Type.	Average weight, pounds.	Average quality.
Uxbridge	884	Good	1,250	Fair.
Scott	65	Good	1,300	Fair.
Reach	532	Good	1,250 to 1,300	Good.
Brock	835	Good	1,300	Good.
Thorah	383	Good	1,400	Good.
Mara	373	Good	1,400	Good.
Whitby and East Whitby	524	Good	1,400	Good.
Pickering	1,379	Good	1,400	Good.
Total	4,975			

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions	106	4,576	104	4,397	12	2	179	12
Grade Stallions	7	399	7	399	8			
Totals	113	4,975	111	4,796		2	179	

Ontario—Concluded.

At the Port Perry meeting held November 13th for the County of Ontario, sixty-five were present. The following are points taken by some of the speakers and approved of by those present:

An Inspection and License law might do good, but there might be considerable difficulty in carrying out the work of inspection and licensing. If a license law were passed it should also extend to an inspection of the progeny, and to imported horses at time of landing. Men should club together and in this way get good sires by forming a syndicate, if this is properly done. Horses not registered, and not serviceably sound should not be allowed to stand for service. A license fee should be only as high as will meet the cost of inspection. The Government should encourage Agricultural Societies to give premiums to good horses and get them into a neighborhood. Government should inspect and license first, and then encourage societies to give premiums afterwards. In Scotland, in lieu of premiums, 90 to 100 mares is the limit that district stallions are allowed to serve. There are just two classes of horses that are profitable, the heavy horse and the harness horse. The expert judges sent out should report to the Government the class of horses found in the different districts in the Province. There are many light horses travelling in this locality which have never left a good colt. This district is pre-eminently fitted for the breeding of heavy horses. A License law should be brought into operation at once. The following motion was moved by Jno. Vipond, seconded by Herb. Collacott, and carried unanimously:

"We the breeders and horsemen of the riding of South Ontario do hereby request that a license be placed on stallions in this riding, and also that none but a stallion of recognized breed be allowed to be used for service, and that he be recorded in our Stud Book, or in the book of the country in which he was bred. We also would request that an unsound stallion be not granted a license when his unsoundness is of an hereditary nature, such as side bones, spavin, ringbones, etc., and further, that there be a license fee of $25. Also that the Government should encourage horse breeders' associations and district societies."

SPECIAL REPORT OF INSPECTORS.

We beg to submit herewith our own impressions gained while engaged on the work of horse inspection, and our own opinion as to whether the horse industry of the Province would be best encouraged by means of a Government Inspection and License law.

At the outset, according to instructions we sought to keep our own counsel, and endeavored to draw out the opinions of the owners of stallions. uninfluenced by any ideas or suggestions made by us. Although the majority of the stallion owners seemed to favor inspection and license, yet with the exception of two or three individuals, none seemed to realize, that, in the event of such an act coming into force, their own animals would fall under the ban. Although the report shows that a large percentage of stallion owners favor the Inspection and License system, yet, in conversation your Inspectors were strongly impressed with the idea that the great majority of those had given the matter very little serious consideration, and therefore were not in a position to give an opinion as the result of careful and mature deliberation. As a consequence, when the public meetings were held, and some half dozen or so would express themselves as being favorable to inspec-

Report Inspectors' District 5.—Continued.

tion and license, the balance of the gathering as a matter of course fell in line, having no definite opinions of their own. Even those who carried the meetings did not impress your Inspectors with the idea that they had given the matter sufficient consideration to realize the difficulties which the Department may encounter in carrying out their suggestions.

In the prosecution of our labors, and as the result of serious consideration your Inspectors are so keenly alive to the following observations that we herewith present them to your judgment.

(1) Many inferior sires are being used in service throughout this district of the Province, and many, even some good sires are kept in miserable unhealthy and unthrifty condition.

(2) A number of sires have been sold to their present owners at exorbitant prices.

(3) That the crossing of Percheron sires (of which we saw quite a number) upon the class of heavy females of the Province, principally of Clydesdale and Shire breeding will result in serious injury to the horse breeding industry.

(4) In some sections of our district, if inferior sires were prohibited from standing for service, there would not, at present, be a sufficient number of suitable sires, and in those sections many farmers do not seem to realize the great advantage of breeding from good dams and to good sires, and in consequence, there is great need of educational work along this line, and the need of a better class of breeding females, both heavy and light.

(5) That the system of ownership by syndicate, although, in theory, it may appear to be ideal, yet in practice has proven such a signal failure, that great caution should be taken in giving the movement any further sympathy or encouragement.

(6) In some of the more advanced sections we found those who urged that instead of inspection and license a vigorous educational campaign be conducted, through the O. A. C. short course in judging, the Agricultural Societies, and the employment of well informed and successful horse-breeders as Institute lecturers, thus spreading the gospel of wisdom to those who desire information. These are mediums of instruction which we consider the Department would do well to endeavor to still further encourage and strengthen.

(7) While the information gleaned from this inquiry, will, as already intimated, be valuable to the Department in their further efforts in assisting this important branch of live stock development, yet we would be very cautious in advising the inspection, and more particularly the licensing of sires. What is to be gained thereby? Is it not a fact, that, in the mind of every successful breeder, no legislation is required in order to compel him to act in his own best interest in this matter. These men, although in some sections they may be comparatively few, yet practically speaking, are strewn all over the Province, and if their next door neighbors with this object lesson right before their eyes, are so blind they will not see, would it not be highly impolitic in this free democratic country for the Government to force upon an unwilling people, what their own best interests tell them they ought to do. Were it a matter of human life or health that was at stake, the case would be very different. Take for instance the handling and treatment of the farmers' milk supply. Milk and the products thereof, constitute a vital portion of the food of humanity. In the handling of that article of diet the health and vitality of our people are at stake, and the Government would be

Report Inspectors' District 5.—Concluded.

justified in interfering, entering upon the private farms and by law or regulation, forcing the removal of conditions which produce a dangerous contamination; yet thus far this is not done, and there is no parallel in the two cases. What would the matter of horse inspection alone accomplish? It would certainly compel stallion owners to stand and advertise their animals under their true colors. If this inquiry reveals any deception upon this score being practiced, (although under our present law a severe penalty is attached) then some further regulation may be enacted. In our five or six weeks labor, no such case has come under our notice. The matter has never been mooted. Every person in the locality seems to be quite conversant with the breeding of the animals they patronize. If the sire in question happens to be unsound in any particular, the owners of competing sires soon get to know, and publish the fact broadcast over the community.

(Signed) THOMAS MCMILLAN.
WILLIAM MOSSIP.

DISTRICT NO. 6.

Counties—Hastings, Peterboro, Victoria, Durham, Northumberland and Prince Edward.

Inspectors—J. G. Clark, Ottawa, and Jas. Irving, Winchester.

HASTINGS.

In Sidney township the Inspectors report that the majority of the stallions are totally unfit for breeding a good class of horses; most of them are undersized and unsound and of poor quality, and colts of any kind are quite scarce. The horsemen here were found in favor of stallion inspection and the licensing of good horses for the protection of breeders. Five of the stallions are Standard-bred, one being a good individual. There is also a good Hackney. The balance includes a fair Clydesdale and an aged Coach grade. Fees vary from $8 to $16. Mares are of only medium quality, many being unfit for breeding purposes; worn out and crippled mares being generally bred.

In the townships of Thurlow and Tyendinaga there are some very good stallions including Standard-breds, a French Coach, a grade English Coach horse and a Clydesdale. In numbers there are four Standard-breds and two grades of that breeding; a Clydesdale and a grade, a French Coacher, three French Canadians, unrecorded, an English Coach grade and a Shire grade. There is no absolute unsoundness and some of the horses have the reputation of being good stock getters. There is a wide range in fees from $7 to $20. As regards mares there is a tendency to breed too many light mares without regard to strength and substance. Mares are somewhat better than in Sidney township, but stallion owners claim that good ones are scarce and that the reputation of stallions is seriously injured by the mares with which they are mated being inferior and unsound, and the colts partaking of their unsoundness and inferiority. Among stallion owners the idea of stallion inspection seems to meet with universal approval. Some difference of opinion was met with in reference to a license fee. Many of those spoken to laid special emphasis on the necessity for the greatest care on the part of the Inspectors (if such were appointed) in inspecting the progeny of the stallions under consideration; as many had found that many registered stallions had not been successful as stock getters.

There are several grade sires in Hungerford township, and pure-bred stallions are considerably in the minority. The pure-breds are three Clydesdales and a Hackney; the grades are Clydesdales seven, Standard-breds three, Coach one, and Percheron one. With few exceptions the standard of merit is rather low and so are service fees, from $5 to $15, the majority not exceeding $10. Mares are chiefly cross-breds, light general purpose, with a few small Roadsters. A few heavy blocky mares were seen that would mate well with good Clydesdale or Shire stallions. Stallion owners are divided about the amount of a license fee; some favored a high one. The opinion seemed to be unanimous that the scrub stallion should be put out of business. but none of the owners apparently consider the possibility of their own horses coming within that class. Some favor an act of Parliament giving stallion owners a lien on the progeny until the service fee is paid. All the evidence goes to show that haphazard breeding and the patronizing of cheap horses are responsible for the slow progress being made in the improvement of horses here. The scope of a stallion act came in for a lot of discussion. Men who have had good results from cross-bred horses would not favor the

Hastings—Continued.

disqualifying of unregistered sires. Much evidence is forthcoming where cross-bred horses have given better results than some of those registered.

In the three townships of Elzevir, Madoc, and Marmora there are three pure-bred Clydesdales, an imported Hackney, a Clydesdale grade, two Standard-bred grades, and a French-Morgan horse. The inspectors state that some are very good horses, and that farmers are taking more interest as to the stallions used. Stud fees are from $7 to $12. All horsemen here think a stallion Inspection Act the most practical thing.

The quality of some of the imported stallions comes in for severe criticism, as their progeny compares unfavorably with those of Canadian-bred, and even cross-bred stallions. Here as elsewhere lack of judgment in the selection of suitable sires to mate with the type of mares on hand has led to failure. Opinions as to the amount of license fee differ, but all agree as to the expediency of a license law. There are some very good general purpose mares in these townships, but a large number are too small to give good results when mated to heavy sires.

There are only three pure-bred sires in Rawdon and Huntingdon townships, one an imported Clydesdale, one an English Coach horse, and the third a Standard-bred. Of grades there are three Clydesdales, three French, and a Standard-bred and a Percheron. Some of the grades are good-looking horses, but are not well enough bred to prove good sires. There is some unsoundness among them. They stand for fees from $6 up to $10, and one is quoted at $25. Mares vary in quality, there being some good, useful ones seen, but too few show signs of breeding among the heavy class. The Coach and Roadster average up better.

In the townships in the northern part of Hastings county there are three pure-bred Clydesdales, a pure-bred Shire, and a Percheron and French Canadian grade respectively, all sound except one, but only just fair in conformation. There are four syndicate horses among them purchased at pretty high figures. They serve for fees from $5 to $10.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	7	1,700	7	6	Fair	506	10
Clydesdales, Canadian-bred	5	1,565	8½	4	Fairly good.	547	10
Grades, Clydesdale	12	1,420	5	All.	Fair	905	7
Shires, Imported and Grades of Shire breeding	2	1,525	4	All.	Only fair	71	7
Grades, Percheron	3	1,375	10	2	Fairly good.	165	7
Hackneys, Imported and Canadian-bred (2 Imported, 1 Canadian-bred)	3	1,325	6	2	Fairly good.	250	14
Standard-breds, Imported	5	1,090	7	2	Fairly good.	155	16
Roadsters, Canadian-bred	3	1,180	5	All.	Very good.	87	10
Grades, Roadster	10	1,090	5	6	Fair	244	8
Grades, German Coach	2	1,400	9	1	Fair	40	8
French and English Coach	2	1,250	9	All.	Good	72	13
Grades, English Coach	2	1,250	10	All.	Fairly good.	96	10
Grades, French Canadian	8	1,200	6	All.	Fair	454	7
Totals	64					3,592	

Hastings—Concluded.

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average weight, pounds.	Average quality.	Average age.
Sidney	416	Light, General Purpose and Drivers	1,000	Medium	12
Thurlow and Tyendinaga	796	Majority light, General Purpose with a few Standard-breds of fair quality	1,075	Fair	11
Hungerford	835	Light General Purpose, some Standard-breds and Clydesdales	1,150	Medium	10
Elzevir, Madoc and Marmora	519	Mostly General Purpose, a few Clydesdales and some Hackney and Standard-breds	1,100	Fair	10
Rawdon and Huntington	624	Light General Purpose	1.150	Medium	12
Dungannon, Monteagle and Wollaston	402				
Total	3,592				

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions	26	1,677	20	1,429	12	6	248	14
Grade Stallions	38	1,915	32	1,709	8	6	206	7
Totals	64	3,592	52	3,138	....	12	454	....

Very few of the horsemen spoken to hesitate to denounce the scrub stallion, and most of them speak of legislation against them as the only way of overcoming this nuisance. Some think that education through the Farmers' Institutes would bring more business to the owners of well bred horses. There is much difference of opinion among farmers as to the proper definition of the word "scrub" as applied to stallions, and this question was much discussed at the public meeting held at Madoc on October 17th. No recommendation was made by those present as the meeting was about evenly divided, half being in favor of legislation on the subject and the other half claiming that the Government should work along educational lines.

PETERBOROUGH.

As regards the townships of Belmont, Methuen, and Dummer in this county, the Inspectors report a decided improvement in the class of heavy horses inspected, and there is evidence of more intelligent interest being taken by farmers in horse breeding. The "scrub" is much complained of, however, and any legislation that will protect the owners of high class horses and encourage systematic breeding will be favorably received by most of the horsemen here. Stallion inspection and a license fee appear to be the only form of legislation considered likely to improve the present state of the horse industry. With but two exceptions, a Clydesdale and a Percheron, all the sires inspected were grades, viz., a Coach, Clydesdale, Percheron, and two Standard-breds. One is not sound, but on the whole they average up fairly well. The maximum for stud fees is $10, and minimum $5. Mares in these townships are a little better and heavier than in some of the other districts, but show no particular line of breeding with the exception of some grade Clydesdales. There are also a few registered mares of that breed. While there are a large number of light mares, there are not many high class drivers among them.

Peterborough town being adjacent to the townships of Otonabee and Asphodel, there are naturally a large number of stallions travelling in that section. Included in them are five pure-bred Clydesdales, and seven grades, eight pure-bred Shires, a German Coach horse, three pure-bred and two grade Standard-breds, a Percheron, a French Canadian, a pure-bred and a grade Hackney and a nondescript. There is a good deal of unsoundness among these horses, and some, at least, should not be travelling on this account, and also for poor conformation. There are some good sires amongst them, however, and some have good reports about them as stock getters. There is a pretty wide range of fees from $5 to $15, the former for grades. Mares here show some improvement along draft lines, not too many are old and worn out and not suited to give the best results in breeding. Very few give evidence of breed quality, and most of them are too light to mate with heavy stallions. Here, again, horsemen are nearly all a unit in asking that steps be taken to banish the "scrub" stallion, but opinions differ as to what action should be taken. Some would make registration a necessary qualification for all stallions, while a large number seem to favor inspection of all stallions as well as their progeny. The fact that some registered stallions have been failures in the stud, while some unregistered horses are recognized in the community as excellent stock getters, is put forward as an argument against pedigree qualification being made the standard. Many express the conviction that educating farmers as to the advantages of line breeding and the proper mating of their mares should be attempted before compulsory legislation is introduced.

The townships of North Monaghan, Smith, and Ennismore also benefit by the proximity of Peterborough, and no less than twenty-three stallions are found in this district. In this list are three pure-bred and six grade Clydesdales, three pure-bred and one grade Percheron, one Shire, four pure-bred and four grade Standard-breds and a grade Coach horse. Here, too, there is some unsoundness, but even among the grades there are some pretty goood horses. Six dollars is the lowest stud fee and $15, the highest. Mares are of fair average quality, but the age average is too high. The general purpose type of about 1,200 lbs. predominates, but there are a few Clydesdales and some good road mares. Stallion owners

Peterborough—Continued.

complain that the best mares are used on the road, and the culls kept for breeding. The greatest hindrance to improvements is the cheap stallion. Owners of high priced horses are anxious for legislation to protect them. The amount of the fee carries more weight with some farmers than the quality of the stallion or suitability of the mare. Education is much needed along the lines of intelligent breeding and mating of mares. The majority of those spoken to favor stallion inspection, and quite a number advocate a license fee on all stallions. Opinions vary as to the amount of the fee, some thinking that $25 would be sufficient, others $100. High prices offered for horses have induced farmers to part with their good mares. The introduction of the cayeuse into this district has also lowered the standard as many farmers have been foolish enough to breed them.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	3	1,730	6	All	Fairly good.	215	13
Clydesdales, Canadian-bred	6	1,700	4	All	Fairly good.	432	11
Grades, Clydesdale	14	1,550	7	9	Fair	576	8
Shires, Imported	9	1,765	7	8	Fair	166	9
Percherons	5	1,740	7	4	Fairly good.	360	11
Grades, Percherons	2	1,550	6	All	Fairly good.	115	9
Hackneys and Grades	2	....	5	All	Fair	100	12
Standard-breds, Imported	3	990	11	2	Good	226	14
Roadsters, Canadian-bred	4	1,120	11	3	Pretty good.	141	12
Grades, Roadster	8	1,150	5	5	Fair	143	8
German Coach and Grades (1 pure-bred; 2 grades)	3	1,450	13	All	Fairly good.	269	10
Grades, French Canadians and those of no particular breeding	3	975	3	2	Poor	21	7
Totals	62					2,764	

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average weight, pounds.	Average quality.	Average age.
Belmont, Methuen and Dummer	324	A few heavy, mostly light general purpose	1,200	Fair	....
Otonahee and Asphodel	1,256	Mixed	1,200	Fair	12
North Monaghan, Smith and Ennismore	1,184	Mixed	1,200	Fair	12
Total	2,764				

Peterborough—Concluded.

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions..	32	1,740	28	1,572	12	4	168	14
Grade Stallions......	30	1,024	21	820	8	9	204	10
Totals..........	62	2,764	49	2,392	....	13	372	....

At the Peterborough meeting on October 24th, there was not a very large attendance owing to a severe thunderstorm that evening. A motion was carried favoring a standard of registration in the recognized stud book of the respective breeds in order to qualify stallions for service, and the majority were in favor of legislation to prevent "scrub" stallions doing business. Opinions varied as to the most profitable class of horse to breed, but the majority are breeding for the heavy horse market, and consider heavy horses most profitable. The syndicate system of ownership is not very popular. The opinion of many is that syndicate horses are purchased at prices much beyond their value. With very few exceptions, horsemen consider stallion inspection a good thing. This, and a license fee on all stallions seem to be the two principal methods suggested to improve the horse industry.

VICTORIA.

Two-thirds of the stallions standing for service in Emily township in this county are classified as sound, and, taken as a whole, they seem to be a fair lot. There are four registered Clydesdales and two grades, one of the latter being a cross on French stock, a cross occasionally found in this and adjoining counties; three Standard-breds and a grade, a Percheron, and a Thoroughbred. For most of these the fees range from $8 to $14. Ten being a common charge. Mares are medium, and of mixed type.

There is not much difference in the type of mares in Verulam township, except that occasionally heavier ones are met with, but the general quality is only medium and average weight about 1,150 lbs. In this township is found what is rather rare, seven Suffolk Punch stallions. They are all in the one stable, all typical of the breed and sound. Besides these there are three pure-bred and two grade Clydesdales, three grade Standard-breds and two French horses, one unregistered. There are a few unsound horses, and, apart from the Suffolk Punch and some Clydesdales, there are not many good ones in the district. Five, eight, ten, twelve and fifteen dollars are some of the fees charged. In this section a number of horsemen express themselves as opposed to compulsory legislation in any form in connection with horse breeding.

While there are in the townships of Fenelon and Somerville thirteen sires, some of these the Inspectors were unable to see, and therefor, there is

Victoria—Continued.

no report of such. Of those seen there were three pure-bred Clydesdales, two of them imported, and two Standard-breds, one of these not being registered, though eligible. They are a fairly good lot of horses, and their stud fees are from $10 to $15. Mares are of mixed types, as elsewhere, and average 1,250 lbs.

Mares in Ops township are fairly good, with a large percentage of draught type, averaging 1,300 lbs. There is a good percentage of Clydesdale stallions located in Lindsay, all seven being pure-bred. Besides these there are four Standard-breds, two Coach horses, and a French Draught. No less than four are unsound and are unfit for service. The balance are fairly good. $10 is the minimum service fee, and $15 the highest except for a Standard-bred for which the fee is $25. Horsemen interviewed, expressed opinions similar to those already given; while the majority favored stallion inspection, there are still quite a large number of breeders doubtful as to the wisdom of such legislation.

There is quite a noticeable improvement in the quality of both stallions and mares in Marposa township as compared with some of the districts previously visited. While mares are of mixed breeding and very few conform to any particular type, still they average fairly well in quality and weight. There is no unsoundness reported amongst the stallions inspected, which comprise six pure and four grade Clydesdales and two Standarl-bred grades and a grade Thoroughbred. Service fees are only given in some cases and work out at $9 to $15. Some of these stallions only stand at their own stables. Inspection and license on stallions seem to be the most favored form of legislation.

The stallions in Eldon township are not so good as they might be, with perhaps, three exceptions. Heavy horses are most popular. A lack of good mares and the patronizing of unsuitable stallions hinder improvement. The majority of horsemen favor a stallion Inspection Act as a means to improve the horse industry. There are five Canadian-bred Clydesdales and a grade, a Standard-bred and a grade in this district, besides two that the Inspectors were unable to examine. One horse has passed his usefulness, but has been a good one.

The following suggestions made in writing to Inspectors by a horseman of this county are given here in full:

"There are two or three things a Government measure ought to deal with most stringently. One is unsoundness, whether acquired or otherwise. Unsound horses should not be allowed to do business, even should their breeding be all that is required. No license should be granted, and if their owners are known to collect fees, make it hot for them.

"The inspection made by a competent Inspector.

"I think too it is highly important that the Government define clearly the standard of character required. I am inclined to think it would not be wise to place that standard too high at first, but say in four or five years, by a gradual process of thinning out, reach a standard equal to or higher than our Associations require.

"My reasons are that a great number of men have purchased stallions for next year's service that will not begin to reach what is required by either the Clydesdale or Shire Associations. In these cases it would be a

Victoria—Continued.

great hardship if they were refused a license. Again, if the standard is placed high at first the licenses might be too few for the amount of service required. I do most strongly deprecate crowding a horse for all he is worth. Sixty or seventy mares ought to be the limit, and I would be an advocate for keeping the service down to this limit. Let a register of service be produced at the time of obtaining the license, and if service exceeds, withhold license. Again, let the Act say to those importing, 'You will not be able to obtain a license unless your horse comes up at least to the standard required by our associations; importation alone will not count.' This is a most important point and, if enforced, would I think, be the greatest boon to this business.

"In this section we have been confining ourselves principally (75 per cent.) to the Clydesdale and Shire, and I think perhaps we have some specimens of these as good as are to be found anywhere, but they are few. The reason is not far to look for. Although using imported stock this stock has not been of any higher character, and in very many cases, a good deal lower than the mares bred. As an instance, three years ago an imported horse was syndicated to the west to me, and I was approached to use my mares. They handed me his card, and I immediately found that he had but one cross on his dam's side, his being only the second cross. Now this horse cost about $2,500. That, with the fact that it was imported, brought to it some of the best mares. Can you look for improvement under such circumstances. We want to stop the introduction of such short pedigreed stock.

"Now in the case of Standard-breds I think that breeding (straight line) alone should count. There is no class of horses that needs such drastic measures applied as this class. Observation convinces me that but little improvement has been made, if any, in the appearance and gait of our Road and Carriage class for very many years, and if it is only through straight pure-breeding we get improvement in other breeds it cannot be otherwise in this class. Let us have a clear well defined law of registration along this line.

"Now as to license, I am of the opinion that it would be the wrong way of doing things to place a high license on the 'good horse'. Put it on the other horse. Those are the ones we want to get rid of, and I would grade up his license according to his character, making it as prohibitory as possible. If you place a high license on the good horse, of course he must increase his fee. Now, while I would willingly pay a good large fee for good service, my neighbor says 'Well, if I have to give that I simply cannot afford it,' and the consequence is he does not breed. Now that would be a great hardship and likewise a misfortune. My idea is to strive to keep the good service down as low as possible, and the poorer service up so near to it that the difference of fee would be so trifling as not to be considered or valued. If we can only get there we will be on the forward march.

"Again, I think it would be a good idea to publish a list of all the horses licensed to do service, in the local papers, this to be sent in by the Inspector and vouched for by him. This would act as a check on unlicensed service, assuming this service to be punishable.

"I would make it compulsory to have a certified copy of the character and inspection and name of the horse on the bills or whatever advertising medium he had. I think a commission ought to be appointed in every dis-

Victoria—Continued.

trict to inspect and issue licenses, the commission to sit in different places in the district; those days to be advertised in the local papers long enough ahead so that all could know and be prepared for it. The commission to consist of say four farmers well known as good stock men, and men with backbone enough to say what they think. The vote to be taken by ballot.

"Every sire receiving a license should be minutely described, etc., and the places of service given with owner's name, groom's name, amount of fee. As for the lien, I do not think it worth much."

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	8	1,700	6	All	Fairly good.	554	15
Clydesdales, Canadian-bred	22	1,560	4	18	Fair	971	10
Grades, Clydesdale	8	1,195	6	7	Fair	213	7
Percherons and French Draught	2	1,750	6	....	Poor	71	8
Suffolk Punch	7	1,455	3	All	Fair	67	....
Standard-breds, Imported	6	950	15	All	Fair	290	15
Roadsters, Canadian-bred	3	1,150	6	All	Fair	184	12
Grades, Roadster	8	1,100	7	7	Fair	267	8
Thoroughbreds and Grades	2	....	12	1	Fair	....	....
Cleveland Bay	2	1,500	7	All	Good	140	10
French Canadians and Grades	2	1,200	7	All	Fair	111	10
Unenumerated	8						
Totals	78					2,868	

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average weight, pounds.	Average quality.	Average age.
Emily	573	Mixed	1,100	Medium	....
Verulam	708	Mixed	1,150	Medium	13
Fenelon and Somerville	309	Mixed	1,250	Medium	10
Ops	813	Mixed	1,300	Fair	10
Mariposa	197	Mixed	1,250	Fair	11
Eldon	268	Mixed	1,300	Fair	10
Total	2,868				

Victoria—Concluded.

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions .	52	2,312	45	1,975	12	7	337	9
Grade Stallions	18	556	16	421	8	2	135	8
Unenumerated......	8							
Totals	78	2,868	61	2,396	....	9	472	....

The meeting held in the Council Chamber, Lindsay, for the county of Victoria on October 31st, was not very largely attended, about twenty-five being present.

Several suggestions were made regarding licensing and line breeding. Some favored an inspection of the stallions, others opposed it. There was also a division of opinion as to syndicating stallions. Upon a vote being taken it was found that a majority of those in attendance were in favor of an Inspection Act.

DURHAM.

The Inspectors state that the breeders are paying a good deal of attention to selection of their stallions and improving the quality of their mares along draught lines, but the light horse breeding is suffering for want of a better class of mares and more careful mating.

The mares in the townships of Hope and South Monaghan are chiefly of Clydesdale blood, with a few of road and general purpose type. They average about 1,400 lbs. in weight, and are of fair quality. The sires in this neighborhood consist of three Standard-breds, two unrecorded, three Clydesdales, an imported Shire, a grade Coach, and a German Coach grade, Two-thirds of them qualify as regards soundness, but average conformation is only just fair. Stud fees are $7, $10 and $15.

The townships of Cavan and Manvers are well supplied with Clydesdale stallions of good average quality, also with Hackneys, Percherons, and Standard-breds. First class mares are much needed for improving the general average of the stock. The number of stallions here is considerably increased on account of the presence of a large number of imported horses in stables at Millbrook. Clyesdales number, pure-breds 25, grades 2; Hackneys 12; Percherons 4 and Standard-breds 4. There is too large a proportion of unsoundness, but there are some good horses both among the imported and Canadian-bred ones. Many of the sires being recently imported for sale do not stand for service. Service fees run from $7 to $15.

Durham—Continued.

Cartwright township has nine stallions within its limits comprising three registered and two grade Clydesdales, a registered Standard-bred and two grades and a French Canadian. They are all serviceably sound and of good average conformation. There is not a wide range of service fees which are $8 and $10. Mixed breeding is the rule among the mares here, but there are a few registered Clydsdales. The average weight is 1,200 lbs.

Bowmanville being in Darlington township, naturally swells the total stallions for this section, among which are some excellent horses. With three exceptions there is no unsoundness recorded against the nineteen stallions, of which six are registered and three unregistered Clydesdales, four Hackneys, four Standard-breds and a grade, and a Percheron. The maximum stud fee is $25 for a Hackney and minimum $10. Among the draught mares in this township are some very good animals, and the average quality is fair. Hackney mares are fair in quality, but other light types are poor. The general average is 1,250 lbs.

In Clarke township the breeds represented by stallions are Clydesdale, Percheron, Suffolk Punch, Hackney, and Standard-bred. Four stallions were not seen and their breeding is not given. Of Clydesdales there are five, Percherons one, Suffolk Punch one, Hackneys two, and Standard-breds two. All are pure-bred and sound and their average conformation is fairly good. From $8 to $15 is the variation in service fees. As to the mares they are of a mixed type averaging in weight 1,250 lbs., those of draught type being good in quality, but light type are only medium.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	28	1,600	8	21	Fairly good.	1,926	12
Clydesdales, Canadian-bred	16	1,650	5	All	Fairly good.	901	10
Grades, Clydesdale	6	1,280	3	5	Pretty good.	214	9
Shires, Imported and Suffolk Punch	2	1,600	7	All	Fair	218	12
Percherons	5	1,600	3	All	Fair	185	12
Hackneys, Imported	17	1,160	3	12	Good	378	15
Hackneys, Canadian-bred	1	1,200	4	All	Good	50	10
Standard-breds, Imported	6	1,030	10	5	Fairly good.	152	12
Roadsters, Canadian-bred	6	1,125	12	All	Fairly good.	361	10
Grades, Roadster	5	1,300	3	4	Only fair	40	10
Grades, German and English Coach, and French-Canadian	3	1,375	109	All	Pretty good.	129	8
Unenumerated	4						
Totals	99					4,554	

Durham—Concluded.

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average weight, pounds.	Average quality.	Average age.
Hope and S. Monaghan..	269	Mostly draught	1,400	Fair.....	10
Cavan and Manvers	2,015	Mostly draught	1,400	Fair.....	11
Cartwright	473	Mixed..................................	1,200	Medium .	10
Darlington	877	Mostly draught, some Hackneys and Standard-bred..................	1,250	Fair.....	10
Clarke......	920	Mixed............	1,250	Draughts, good ; Roadsters, Medium	10
Total...............	4,554				

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions..	81	4,171	68	3,909	10	13	262	11
Grade Stallions......	14	383	12	350	9	2	33	8
Unenumerated......	4							
Totals..........	99	4,554	80	4,259	....	15	295	.....

At the public meeting held at Orono, November 9th, Mr. Thos. Cowan, Orono, moved, seconded by Mr. H. C. Hoar, Hampton, "That a tax of $100 be levied on all unregistered stallions kept for service, and that registered stallions be inspected and be required to measure up to a proper standard of quality, soundness, and conformation in order obtain a permit to be used as stock horses." Carried unanimously.

NORTHUMBERLAND.

Coming to Northumberland county the first townships visited were Hamilton and Haldimand. Some of the stallions found here are good, but too many are not of a quality to improve the horse standard. Patronage of inferior stallions and breeding from inferior mares appear to be the most serious hindrance to improved conditions. Here, too, the majority of horsemen are in favor of a Stallion Inspection Act. The stallions are twenty in number, being ten pure-bred Clydesdales, three grades of same blood crossed with French, two Shire grades, a Percheron, a Standard-bred, and two grades, and a grade Thoroughbred. Their average conformation is only fair. Service fees range from $8 to 15. As regards mares, those of Clydesdale type are good, but lighter stock is inferior.

Northumberland—Continued.

The tendency of the sires in Cramabe township is towards the light breeds, there being six Standard-breds, two Hackneys, two Clydesdales, a Shire and two Percherons. It cannot be said that the average is good, although there are a few horses of nice quality, and the stud fees are not lower than $10 and as high as $15 and $25. The mares here do not scale over 1,200 lbs. on the average, and are rather an inferior class. "There is much room for improvement," say the Inspectors, and a hesitancy on the part of many farmers to breed their best mares seems to be one of the difficulties. Stallion inspection and more education along the lines of systematic breeding are among the suggested means of improvement.

There are rather more heavy sires in Percy and Seymour townships than in the last named, the proportion of heavy to light being about equal. There is considerable unsoundness, however, reported and average quality is not very high. Minimum stud fees are $5 in one case, and the general amount is from $8 to $16. Mares are, with few exceptions not of any particular type. The majority of the heavier class lack size and the lighter ones substance. Breeders in this section, as a rule, are ready to favor any legislation that will encourage improvement in stallions imported.

In too many cases much injury is being caused by inferior registered and imported stallions which do not compare as favorably as they should with the grade, either individually or by their progeny.

In Brighton and Murray townships more young mares have been bred lately, but there are still too many unsound and inferior ones being bred for improvement to be rapid. Their type is mixed, being on the average not above 1,100 lbs. and quality is medium. There are nine grade stallions in this section to three pure-breds, these latter being all Clydesdales. The grades are made up of the following breeding; Clydesdales four. Percheron one, Standard-breds three (one, it is claimed, being entitled to record), and French one. The highest service fee is $10 and lowest $5. Two, at least, are unsound.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	6	1,680	7	4	Fairly good.	590	12
Clydesdales, Canadian-bred	11	1,560	4	10	Fair	676	10
Grades, Clydesdale	9	1,475	7	8	Fairly good.	546	8
Shires, Imported and Grades (1 pure-bred ; 3 Grades)	4	1,500	6	All	Fairly good.	178	12
Percherons, Imported and Grades (2 pure-bred ; 2 Grades)	4	1,335	3	3	Fair	198	11
Hackneys, Imported	3	1,365	8	All	Fair	105	14
Standard-breds, Imported	9	1,025	10	8	Fairly good.	406	17
Grades (Roadster and Thoroughbred) (8 Roadsters ; 1 Thoroughbred)	9	965	11	8	Fair	250	8
Grades, French Canadian	3	1,350	12	All	Fair	170	10
Mixed Breeding	4	1,600	3	3	Good	12	5
Totals	62					3,131	

Northumberland—Concluded.

MARES.

Township.	Number of mares bred to stallions inspected in township.	Type.	Average weight, pounds.	Average quality.	Average age.
Hamilton and Haldimand	1,141	Mixed	1,300	Fair	10
Cramabe	434	Mixed	1,200	Fair	11
Percy and Seymour	993	Mostly general purpose	1,200	Poor	10
Brighton and Murray	563	Mixed	1,100	Medium	11
Total	3,131				

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions	32	1,907	28	1,547	12	4	360	12
Grade Stallions	30	1,224	26	1,122	9	4	102	5
Totals	62	3,131	54	2,669	....	8	462	....

The public meeting for the county of Northumberland was held at Brighton on November 15th, and after discussion a motion was carried favoring inspection of all recognized breeds: "That all stallions kept for service be required to pay a tax of $25; that the minimum fee charged for service should be $10 a mare; and that a Lien Act be passed to give the stallion owner a lien on the mare and foal until the service fee for sire of foal be paid."

PRINCE EDWARD.

In the townships of Hallowell and North and South Marysborough there are twenty- four stallions altogether, which include two imported Percherons and two grades, a pure-bred and three grade Clydesdales, a French grade, six Standard-breds and six grades, a German Coach horse, a Carriage horse and a Hackney. Some are too advanced in age to be of much use as sires, and again others are unsound. Altogether they cannot be described as a good average lot, although, as elsewhere, there are some good ones among them. Twenty-five dollars is quoted as the fee for a Standard-bred, but the general fee ranges from $15 to as low as $5. Mares are of a very mixed type, not over 1,100 lbs. in weight on the average, and their quality is poor. A few good ones are found here and there. Some of the stallion owners favor a stallion Inspection Act, but quite a number are indifferent, while others think that legislation is entirely unnecessary.

Prince Edward—Continued.

Mares are no improvement in Hillier township, being poor and very mixed in type. Stallions, too, are not a good lot, with very few exceptions. All are grades except an imported Clydesdale and a Percheron, and are as follows: one grade Clydesdale, two grade Standard-breds, a grade Shire, and two French grades. Their fees run from $8 to $15.

Of the five stallions in Ameliasburg township, four are grades and one a Canadian-bred registered Clydesdale. Three of the grades are of Standard-bred blood and one Percheron. They are a fair average lot. Five to ten dollars is the range of the fees. Mares are a little heavier here and somewhat better in quality.

Sophiasburg has also just five stallions, one a registered Standard-bred, one a grade of same breeding, a Clydesdale and Carriage grade, and two Percheron grades. Three are sound, but there is plenty of room for improvement all round. Service fees are $7 and $8. Mares average the same as in the township previous.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported and Canadian-bred (1 Imported, 2 Canadian-bred)	3	1,650	6	2	Fairly good	223	11
Grades, Clydesdale and Shire (5 Clydesdales, 1 Shire)	6	1,425	9	4	Fair	314	8
Percherons	3	1,800	12	2	Fair	235	13
Grades, Percheron	5	1,370	8	3	Fair	272	7
Hackneys, Imported	1	1,250	5	All	Good	80	15
Standard-breds, Imported	4	970	10	3	Fair	168	15
Roadsters, Canadian-bred	4	1,050	11	All	Fairly good	160	13
Grades, Roadster	11	1,090	6	7	Fair	271	7
Grades, German and English Coach	2	1,325	8	1	Fairly good	137	10
Grades, French Canadian	3	1,100	5	All	Only fair	152	7
Totals	42					2,012	

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average weight, pounds.	Average quality.	Average age.
Hallowell, and South and North Marysburg	1,037	Mixed	1,100	Poor	12
Hillier	552	Mixed	1,200	Poor	11
Ameliasburg	179	Mixed	1,200	Medium	12
Sophiasburg	244	Mixed	1,200	Medium	11
Total	2,012				

Prince Edward—Concluded.

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average age.	Number of stallions.	Number of mares bred to.	Average age.
Registered Stallions..	15	866	12	717	12	3	149	13
Grade Stallions	27	1,146	18	790	8	9	356	8
Totals.	42	2,012	30	1,507	....	12	505	....

At the public meeting for the county of Prince Edward, held at Picton on November 30th, it was resolved: "That this meeting favor stallion inspection and a license fee on all stallions kept for stock purposes. That the stallion owners as a compensation for their license fee should be protected by a Lien Act, giving them a claim on all the mares bred to their horses until fee for said service is paid."

SPECIAL REPORT OF INSPECTORS.

As Inspectors having served in the investigation of horse industry of Ontario, we are convinced that a system of stallion inspection would be beneficial. The district through which we travelled has suffered from the practice of selling off too many of the best mares and using unsaleable, and in too many cases, unsound mares for breeding. Another thing which has had a bad effect on the industry is the importation of inferior, and in some cases, unsound stallions. In our opinion no stallion should be admitted from Britain or any other country that is unsound or does not measure up to the standard of breeding we require from our own breeders. Secondly, we would suggest that a standard should be fixed requiring all stallions kept for service to be free from hereditary unsoundness. Thirdly, that all stallions that qualify should be granted a certificate and be protected in the collection of service fee by a lien on colt. Fourthly, that at Winter Fairs and at Farmers' Institute meetings the subject of horse breeding and the selection of sires should be enlarged upon and given more attention than heretofore.

In the hands of the average farmer the draught and general purpose horses are most profitable, but there are also several men who have well bred, warm blooded mares that are producing high class carriage and road horses that sell for big prices. The system of syndicate ownership has not been generally satisfactory. Under that system there is nearly always too much paid for the stallions, and in many cases cull horses are foisted on the purchasers. The time is ripe for some action to be taken by the Department. Horse breeders and farmers generally expect it.

(Signed.) J. G. CLARK.
JAMES IRVING.

DISTRICT NO. 7.

Counties.—Prescott, Russell, Carlton, Renfrew and Lanark.

Inspectors.—W. F. Kidd, Simcoe; and Geo. Gray, Newcastle.

PRESCOTT.

In the townships of East and West Hawkesbury there are sixteen stallions, two pure-bred and three grade Clydesdales, one pure-bred and two grade Percherons, a pure-bred Shire, three pure-bred and two grade French Canadians, and a registered Standard-bred. All are serviceably sound and of good average conformation. The general average of service fees is very low, $5 being the figure for several; in two cases $10 are charged. One of the imported Clydesdales serving at the last named figure is marked as a very good horse. Mares are general purpose, and from that to very light, poor in quality, very few weighing over 1,150 lbs.

There are four grade stallions in Caledonia township, two being Clydesdales, one being Standard-bred and the remaining one of no breeding whatsoever. The two heavy ones are best as regards conformation, but the Standard-bred is fair in that respect. All are sound. In fact, only two really unsound horses were seen in this county. Fees are $5 in every instance. Mares are a very poor lot.

There are two pure-bred sires in South Plantagenet township, one each of the Clydesdale and the French Canadian breeds. The remaining seven are as follows: two Percheron grades, a Clydesdale grade, a Coach grade, two Standard-bred grades, and a cross-bred Pony and Coach. All qualify as to soundness, and the general average conformation is fair. The fee for the Pony-Coach stallion is $3, the lowest yet met with, and the highest fee is $7. Mares are light in type and poor in quality, showing no particular breeding.

With six grade stallions in North Plantagenet township, four are of Clydesdale breeding and two of French Canadian stock, one of the latter having some Clydesdale blood. Not one is unsound, and they are of fair conformation and action. Stud fees are $5 and $6. Mares are much the same as in the other townships of this county.

There is one pure-bred sire in Alfred township, an imported Shire. The six grades are Clydesdales, two; Percherons, three; and Standard-breds, one. The fee for the Shire is $10; for the others $5, $6, and $7. They are of fair conformation all round.

Two Percheron grades, a Clydesdale grade, a Standard-bred grade, and a Thoroughbred grade make up the list of stallions for Longueil township. Two here are unsound, and the general average conformation is not high. Fees are about the same as in the previous township, $5 and $6. Mares are poor and mostly light, with some general purpose.

Prescott—Continued.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
Clydesdales, Imported and Canadian-bred (2 imported, 1 Canadian-bred)	3	1,700	7	All	Good	241	$ 8
Grades, Clydesdale	13	1,455	5	12	Fairly good	451	6
Shires, Imported, and Percherons (2 Shires, 1 Percheron)	3	1,750	7	All	Fairly good	180	9
Grades, Percheron	9	1,445	5	All	Fair	501	6
Standard-breds and Grades (1 Pure-bred; 5 Grades)	6	1,145	11	All	Fair	86	7
Grades, Thoroughbred and Coach (1 Thorough-bred, 2 Coach)	3	1,100	6	2	Fair	97	6
French Canadians	4	1,300	5	All	Fair	246	6
Grades, French Canadian	5	1,340	6	All	Fair	244	6
No Particular Breeding	1	1,300	8	All	Fair	16	5
Totals	47					2,062	

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average weight, pounds.	Average quality.
East and West Hawkesbury	894	General Purpose and Light	1,150	Poor
Caledonia	145	General Purpose and Light	1,150	Poor
South Plantagenet	438	Light, no particular breeding	1,150	Poor
North Plantagenet	182	Light, no particular breeding	1,150	Poor
Alfred	217	Light, no particular breeding	1,150	Poor
Longueil	186	Light, no particular breeding	1,150	Poor
Total	2,062			

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
Registered Stallions	11	679	11	679	$ 8			$
Grade Stallions	36	1,383	34	1,298	6	2	85	11
Totals	47	2,062	45	1,977		2	85	

Prescott—Concluded.

There were 35 present at the meeting for the county of Prescott which was held at Vankleek Hill on October 13th. Those present were rather unwilling to express their ideas on the subject of stallions. Thirteen were in favor of giving certificates to registered, sound horses up to a certain standard of excellence. Nine were in favor of no stallion being permitted to travel unless licensed. A few were in favor of good grade stallions also being granted certificates. There was a strong feeling that something should be done. It was found that a great many stallions are being registered in some French Canadian book. As far as we can find out any light stallion can be registered for about $20.

RUSSELL.

Russell township is well stocked with stallions, and there are some excellent imported Clydesdales among them, while there are good ones among other breeds and all are sound. Twelve out of the nineteen are imported Clydesdales. The rest comprise a grade Clydesdale, a grade Shire, two grade Standard-breds, a grade Percheron and two French Canadian grades. There is one old horse; the rest are of a good breeding age. Service fees are $6 to $10.

So far as the Inspectors could ascertain, there are very few good mares in Clarence township, and those seen were of a very poor type. As regards the stallions there are two Clydesdales, two Hackneys, a Standard-bred, and a French Canadian, all pure-bred, a French Canadian grade, and a grade of nondescript breeding. Besides these, a French Canadian grade stood for service last year, but died in August last. All are of good average conformation, and all serviceably sound. One French Canadian grade stands for $3. and another grade for $4. With these exceptions fees run from $8 to $20.

There are three unsound sires among the thirteen standing for service in Cambridge township, and all are grades of the following breeds: Clydesdale, five; French Canadian, four; Standard-bred, one; Arabian, one; Belgian, one; no particular breeding, one. In conformation they stand fairly good on the average. Three of them have not travelled as yet. The maximum service fee is $8, and the minimum $4.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
Clydesdales, Imported	12	1,700	4	All....	Fairly good.	910	$10
Clydesdales, Canadian-bred	2	1,600	11	All....	Good.......	223	9
Grades, Clydesdale	6	1,480	7	5......	Fairly good.	250	7
Grades, Percheron, Shire and Belgian (1 Percheron; 1 Shire; 1 Belgian)	3	1,750	5	All....	Good.......	238	7
Hackneys. Imported	2	1,085	3½	All....	Good.......	16	20
Standard-breds, Imported	1	1,075	17	All....	Good.......	40	12
Grades, Roadster and Arabian (3 Roadsters; 1 Arabian Grade)	4	1,050	4	All....	Fairly good.	59	5
French-Canadian and Grades (1 French-Canadian; 8 Grades)	9	1,210	7	8......	Fairly good.	574	6
No particular breeding	2	1,050	7	1......	Fair........	22	5
Totals	41					2,332	

Russell—Concluded.

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average weight, pounds.	Average quality.
Russell	1,374	Some Pure-bred Clydesdales; Light	1,450 to 1,500 1,150	Poor
Clarence	494	Poor	....	Poor
Cambridge	464	Poor	....	Poor
Total	2,332			

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
Registered Stallions	18	1,304	18	1,304	$ 11	....	....	....
Grade Stallions	23	1,028	20	999	8	3	29	6
Totals	41	2,332	38	2,303	....	3	29	....

The meeting for the county of Russell was held at Russell on October 22nd, but was not very well attended on account of the bad roads after heavy rain, which prevented many being present who would otherwise have been in attendance. There were twenty-four stallion owners and breeders present. Great interest was taken in the discussion. All considered the investigation of the horse industry a step in the right direction. Some spoke about the poor quality of many of the stallions, and considered them quite unfit to breed to mares. Seventeen expressed themselves as in favor of licensing all stallions, and that only sound pure-bred horses up to a certain standard of excellence should be granted the license.

The reasons given at the meeting why there were so few good mares in the county were that when horses were so cheap, anything good enough to sell was sold. Many, too, of the farmers have sons in the northwest, and these would take a pair of good mares from the old home or neighborhood, and the old mares were the only ones left to breed from.

Carleton.

Taking the township of Gloucester, the Inspectors found in Ottawa and the adjoining sections ten sires which travelled in this township. There are three pure-bred Clydesdales, (two of them lately imported), three grades of that breed, an imported Hackney, a registered Standard-bred, and two pure-bred Belgians. Two of them are not entitled to be rated as sound, but average conformation is pretty good. They stand at fees varying from $7 to $10. There are a few fair agricultural mares, but on the whole they are under 1,100 lbs. and of poor quality.

There were only three stallions seen in Osgoode township, and, with one exception they are not of great value. They are an imported Shire, a Canadian-bred and a grade Clydesdale. Eight dollars and $10 are quoted as service fees. What has been said of the mares in Gloucester township will apply to this.

In Nepean township there are about 75 registered Clydesdales and Shires, mares and fillies. Many of the remaining mares are agricultural in type, weighing about 1,200 lbs. There are some light ones. Stallions found here belong to the following breeds; Clydesdales, two, pure-bred; Percherons, two, both grades; a Belgian pure-bred, and a pure-bred Standard-bred. They are a pretty good lot, all sound, and fees vary from $7 to $10.

There are seven stallions in North Gower township, consisting of two pure-bred and two grade Clydesdales, a pure-bred and grade Percheron, and a registered Standard-bred. Five are sound, and the majority are of good conformation. Six dollars, $7 and $10 are the fees charged.

In Goulbourne, as in the two previous townships, there are a few registered Clydesdale mares and fillies, but the bulk are agricultural and light. Out of the seven sires here two only, both Clydesdales, are registered. Three of that breeding are grades and so are two of Standard-bred blood. Six-sevenths are sound and average conformation is fairly good. The maximum fee here does not seem to exceed $10, the cheapest being $6.

Mares in Huntley township are an improvement on those in previous townships, and nearly every farm has good teams. The average weight will be about 1,400 lbs. and over. There are a few registered Clydesdales. Horse interests are looked after by seven pure-bred and three grade Clydesdales, a Percheron, a Hackney, four Standard-breds, (three being grades), and a grade Thoroughbred. No less than five are unsound, but rather more than half are rated good as regards conformation. Starting at $5, service fees in one instance reach $15. In one case it is said that the owner will take anything from $1 to $5.

In March township two stallions were inspected, one an imported Clydesdale, a good one, and a Standard-bred. Both have good conformation. The stud fees are $10 and $6 respectively. There are twenty registered mares and fillies in this townships, several agricultural, and a number of general purpose type.

In Fitzroy township mares are much the same in type and quality as in March township. There are about 15 registered Clydesdale mares and fillies here, but the majority are agricultural and general purpose. All the five stallions in this township are sound and of pretty good conformation. They are made up of two pure Canadian-bred Clydesdales and a grade; and one grade of Percheron and one of Standard-bred blood. Stud fees are $6, $7, $8 and $10.

Carleton—Continued.

The city of Ottawa has seven stallions, all pure-bred, and all, with the exception of a Canadian-bred Clydesdale, are registered Standard-breds. All except one inspected were serviceably sound, and all but one stood for a service of $10, one being quoted at $25.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee. $
Clydesdales, Imported	8	1,850	6	7	Good	570	10
Clydesdales, Canadian-bred	13	1,700	6	7	Fairly good.	904	9
Grades, Clydesdale	13	1,470	7	11	Fair	656	6
Shires and Percherons (1 Shire, 2 Percherons)	3	1,800	4½	2	Good	240	10
Grades, Percheron	4	1,575	9½	All	Good	210	8
Belgians	3	1,975	7	2	Fair	295	9
Hackneys, Imported	2	1,200	4	All	Good	75	10
Standard-breds, Imported	4	1,225	4	3	Fairly good.	225	12
Roadsters, Canadian-bred	7	1,200	9	6	Fairly good.	374	7
Grades, Roadster and Thoroughbred (6 Roadsters, 1 Thoroughbred)	7	1,210	6	6	Fairly good.	263	9
Totals	64					3,812	

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average weight, pounds.	Average quality.
Nepean	468	Some registered Clydesdales and Shires, balance agricultural and light	1,200	Medium.
North Gower	320	Mostly draught; a few registered heavy	1,200	Medium.
Gloucester	472	Mostly light; a few agricultural	1,100	Poor.
Osgoode	257	Mostly light; a few agricultural	1,100	Poor.
Goulbourne	149	Draught, agricultural and light	1,200	Medium.
Huntley	1,276	Draught	1,400	Good.
March	170	Some Draught, General Purpose and Agricultural	1,250 to 1,300	Fair.
Fitzroy	342	A few registered Clydesdales, Agricultural and General Purpose	1,250	Fair.
City of Ottawa	358			
Total	3,812			

Carleton—Concluded.

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

STALLIONS.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions..	40	2,683	29	1,860	10	11	823	8
Grade Stallions	24	1,129	21	1,036	8	3	93	8
Totals	64	3,812	50	2,896	....	14	916	....

About fifty men were present at the public meeting for the county of Carleton, which was held at Stittsville on October 30th. A deep interest was taken in the work. Many expressed their ideas, and, apparently, all thought it a good move for the Department to take up the horse question. The uppermost thought seemed to be how to stop the use of scrub stallions. Twenty-seven men were in favor of stallions being licensed; none wished the matter left as it is. A resolution was passed that the grant be withheld from Agricultural Societies who gave prizes to grade stallions.

RENFREW.

In McNab township the Inspectors were unable to see two out of the eight stallions owned here. Of the six seen, one-third were not serviceably sound. They are equally divided into four pure-bred and four grades. To the former list belong a Standard-bred, two Clydesdales and a Percheron. To the latter just the same numbers of the same breeds. One Standard-bred had only recently been brought in. For the others the stud fees are $6, $7 and $10. Mares are general purpose and light in type, very few weighing as much as 1,300 lbs.

There are four stallions in the town of Renfrew and in Horton township adjoining. These are a pure-bred Clydesdale and Belgian, respectively, and a grade Standard-bred and a nondescript. All are sound and pretty good in conformation; of those in service $8 to $10 are the fees. Not much can be said about the mares in this section.

In Admaston township only one stallion was inspected, a pure-bred Percheron, which stands for service at $5.

In Westmeath the quality of the mares improves, and there are a number of fair general purpose mares, as well as a few registered Clydesdales. There are the following sires in this township: two registered Standardbreds, a pure-bred Shire and two Percheron grades. One horse was sick and was not inspected. Three of the others were sound and two of them pretty good horses. Fees are about as usual in these townships, $6 to $8.

Of the seven stallions owned in the town of Pembroke and standing in Pembroke township, all but two are registered, and have fair average conformation. Clydesdales are represented by a grade, and there is a grade French Canadian. The pure-breds are one Percheron, two Standard-breds and a French Canadian. The fee of the grade French Canadian is given as $2; others at $7, $10 and $25.

Renfrew—Continued.

In Stafford, only one stallion was seen—a Percheron grade.

Stallion owners in Wilberforce township travel two pure-bred and one grade Clydesdale, a pure-bred Shire, a grade Percheron, a grade Coach, and a horse of no particular breeding. The pure-breds and the grade Percheron and Coach grade have good conformation. One grade is not sound. Only one owner charges $10 fees; the rest charge from $5 to $6.

Excepting a grade Clydesdale in Bromley township, which the Inspectors were unable to see, the four other sires are a Clydesdale, Shire, and Percheron, and a grade Clydesdale. They are of fair average conformation. Two cannot qualify for soundness. The service fee is highest for the Shire, viz., $10, the others stand for $5 and $8.

Two grade stallions, both of French Canadian breeding, one being a Percheron cross, serve in the township of Ross. Only one was seen by the Inspectors, and it was sound and of good conformation, standing for service at $8, while the fee of the other was $5. Very few mares were met with that could be called good. They are of a light type and of no particular breeding. The best mares are sold to the lumbermen. The Inspectors state that in this country they saw some really good stallions, and if these are well patronized, the result should be a considerable improvement in the future.

In the townships of Grattan, Hagarty, Ratcliffe and the districts adjoining, but stationed principally at Eganville and Killaloe, there are seventeen stallions, some of them quite good horses, and the majority of them serviceably sound. A number of them could not be seen by the Inspectors, but from reliable information furnished, those not seen work out a good average as regards conformation and also soundness. There is one syndicate horse. Clydesdales total three pure-breds and four grades; Shires, one pure-bred; Percherons, one pure-bred and two grades; Standard-breds, one pure-bred and two grades, and French Canadians three, two at least being grades. The maximum fee is $10, but the majority run from $8 down to $3, and in one case, anything between $1 and $3 is taken. The best mares seen were under 1,500 lbs., but they are very few in number; the majority are of a light general purpose type and of no particular breeding.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
Clydesdales, Imported	6	1,730	7	5	Fairly good.	255	$8
Clydesdales, Canadian-bred	3	1,540	5	2	Fair	300	6
Grades, Clydesdale	10	1,630	7	7	Fair	789	5
Shires, Imported	4	1,785	7	All	Good	377	8
Percherons	5	1,730	11	4	Good	489	8
Grades, Percheron	7	1,450	5	6	Fair	260	4
Belgians	1	2,100	6	All	Good	86	10
Hackneys and Standard-breds, Imported (1 Hackney, 1 Standard-bred)	2	1,200	8	All	Fair	76	12
Roadsters, Canadian-bred	5	1,090	9	4	Fair	85	4
Grades, Roadster	4	1,050	7	3	Fair	95	7
Grades, Coach	1	1,500	15	All	Good	80	6
French Canadians	2	1,250	8½	All	Good	94	8
Grades, French Canadian	5	1,370	10	All	Good	328	4
Grades, No Particular Breeding	2	1,375	9	All	Fair	141	5
Totals	57					3,455	

Renfrew—Concluded.

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average weight, pounds.	Average quality.
McNab	656	Mixed	1,100 to 1,200	Poor.
Horton & Renfrew Town	152	Mixed	1,100	Poor.
Admaston	93	Mixed	1,100	Poor.
Westmeath	285	General Purpose, a few Registered Clydesdales	1,200	Medium.
Pembroke	307	Mixed	1,100	Poor.
Stafford	30	Mixed	1,050	Poor.
Wilberforce	531	Mixed	1,050	Poor.
Bromley	255	Mixed	1,050	Poor.
Ross	179	Mixed	1,100	Poor.
Grattan, Hagarty, Radcliff and adjoining Townships	967	Mixed, a few very good ones	1,100	Poor.
Total	3,455			

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not Serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions	28	1,762	24	1,642	9	4	120	6
Grade Stallions	29	1,693	24	1,394	4	5	299	5
Totals	57	3,455	48	3,036	....	9	419	....

The meeting for the county of Renfrew was held at Cobden on November 6th, and was attended by about fifty men. Quite a number of those present dropped in from the village to see what was going on. About twenty men were horse raisers. All thought the draft horse the most profitable for farmers to raise. After considerable discussion and questions, seventeen (about all the horsemen present), voted in favor of stallions being licensed. Some thought that *first-class* grade stallions should be licensed because they were superior to many imported ones.

LANARK.

Ramsay township runs almost exclusively to Clydesdale sires, there being two pure-bred and two grades of that breed to one pure-bred Standard-bred. One of the heavy ones is unsound; and the light sire and one of the grade Clydesdales have the best conformation. It seems a pity that

Lanark—Continued.

a heavy horse of good conformation and sound only earns $3 in a service fee. The others earn $5 and $10.

Bathurst township also favors heavy horses, as is evident when the stallion list is made up of three pure-bred and one grade Clydesdale, a Shire and a Percheron. They are all sound and rather above the average in conformation, one Clydesdale especially being marked as extra good. The fee for the grade is $5, for the others $8 in each instance.

There are just four of the heavy and four of the light sires in Drummond township, with representatives of the following breeds: Clydesdales, a pure-bred and a grade; a Shire, a Hackney, a Percheron, a Standard-bred and a grade of that breeding and a grade Coach horse. It is satisfactory to find them all sound and also fairly good in conformation. Stud fees are somewhat higher than in some of the adjoining townships. Beginning at $6 they go as high as $25.

In North Emsley only one sire was inspected, a registered Canadian-bred Clydesdale, sound, and of fair conformation, standing for $8.

This was also the case in Montague township—an imported Clydesdale, a good horse and sound, whose fee was $12.

Three Standard-bred stallions are owned in the town of Smith's Falls, one being recorded and two grades. Two are getting on in years, and have seen their best days. One is unsound. Their fees are $6, $8, and $10 respectively.

A pure-bred Clydesdale, and a grade each of Cleveland Bay and French Canadian blood, make up the trio of stallions in Beckwith township. Two-thirds of them are sound, but conformation is not very good. Five dollars and $8 are the fees charged.

Standard-breds are evidently the favorites in the town of Carleton Place, as there are three registered and two grade stallions of that breed there, the only other sire being a grade Hackney. Of the six, five are sound and of fair conformation. One horse has never stood for service, but the fees for the other five are from $5 to $15.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee. $
Clydesdales, Imported	5	1,690	6	All.	Fair to good	498	9
Clydesdales, Canadian-bred	4	1,660	5	All.	Fair	285	8
Grades, Clydesdale	4	1,475	8	3	Fair to good	224	5
Shires, Canadian-bred	2	1,750	6½	All.	Good	200	8
Percherons	2	1,850	7	All.	Fairly good.	300	10
Hackneys, Canadian-bred and Hackney Grades (1 Hackney, 1 Grade)	2	1,200	8	All.	Fairly good.	128	9
Standard-breds, Imported	3	1,130	10	2	Good	73	17
Roadsters, Canadian-bred	3	1,115	12	All.	Fair	54	11
Grades, Roadster	5	1,120	10	4	Pretty good.	210	9
Grades, Coach	2	1,350	6½	1	Fair	121	6
Grades, French Canadian	1	1,500	26	All.	Fair		
Totals	33					2,093	

Lanark—Concluded.

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average quality.
Ramsay	322	Light to General Purpose	Poor.
Bathurst	700	Light to General Purpose	Poor.
Drummond	408	Light to General Purpose	Poor.
North Emsley	130	Light to General Purpose	Poor.
Montague	93	Light to General Purpose	Poor.
Town of Smith's Falls	175	Light to General Purpose	Poor.
Beckwith	81	Light to General Purpose	Poor.
Town of Carleton Place	184	Light to General Purpose	Poor.
Total	2,093		

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions	20	1,468	19	1,441	12	1	27	10
Grade Stallions	13	625	10	470	8	3	155	5
Totals	33	2,093	29	1,911	....	4	182	....

The public meeting was held at Carleton Place, on November 12. It was a lively meeting, with plenty of discussion. When requested to give their views on stallion inspection, 21 voted for a license for stallions, but they must be sound, registered animals, up to a certain standard of excellence. A good deal was said about the poor quality of many imported stallions. Those present asked that the Government use its influence with some of the horse importers to get them to bring a carload of imported mares and fillies to Carleton Place for sale. They also asked the Government to give a liberal donation for prizes to be given at a spring show for stallions to be held at Carleton Place.

An additional meeting was held in the town of Perth. Fourteen men, all interested in horse-breeding attended, and all took part in the discussions and expressed themselves as pleased with the work undertaken by the Department. Some thought it might be advisable to license for one year really good grade stallions, but only those that were good stock getters. Many objected to grades being licensed. After full discussion all voted in favor of licensing all stallions that were sound and registered animals up to a certain standard of excellence.

SPECIAL REPORT OF INSPECTORS.

The meetings were fairly well attended, but in many cases the bad weather and distance kept those who were interested from attending. At every meeting there was a strong feeling that something should be done; most of the breeders of good horses favored licensing stallions. "None but sound registered animals up to a certain standard of excellence to be licensed," was the idea of the majority. We have seen horses in nearly all the Counties in Ontario and conversed with horsemen in those counties. Some districts have a better class of horses than others, but all over Ontario something requires to be done. In our conversation with horsemen met at Institutes during the last five years, many have favored licensing stallions. It is our opinion that now is the time to go on; the people expect that something more is to be done; the best thing to do is a matter of opinion and there will be great differences in ideas.

There are two points that must be kept in view, viz., enough stallions to serve mares, and how much regulation will the people tolerate. The idea of only having pure-bred stallions licensed is out of the question, because there are not nearly sufficient of them, and many imported ones are not deserving of a license. There must for several years be some grades permitted to travel, until there are enough pure-breds to take their place. After hearing many opinions, we think the following suggestion would find favor with a large majority of the horsemen: The cost of the license or permit, to be nominal, sufficient to cover the expense of inspection, etc. All horses to be free from hereditary unsoundness. Grant a first-class license to registered stallions of good conformation and good action; a second-class license to registered stallions of fair conformation and fair action, and a third-class license to the grade stallions, types of some breeds, producers of useful colts (if old enough to have colts).

We do not think it would be just to give the good and medium registered horse the same class of license. There would be no education in doing so. These three grades of permits, or licenses will certainly take in every horse that any horseman would be justified in using.

We are not in favor of second-class registered or grade horses, but the license would be for one year only, and the standard could be raised the second year, gradually getting rid of the most undesirable.

Anything less than the above appears to us, not likely to give favorable results. In some parts of Ontario the stallion fee is so much for the season. This is not fair to the owner of the mare—too one-sided a bargain. Let the owner of the mare pay half at time of service and the other half when the mare proves to be with foal. This method would prevent many barren or worn-out mares being bred, and would also prevent the stallion taking more mares than is reasonable for a fair percentage of foals.

We would suggest that prizes for stallions and mares be offered at the Winter Fair at Guelph. Farmers are there from all over Ontario, and we consider it would be a grand opportunity for the Government to educate those who are anxious to learn about horses. We would also suggest that spring stallion shows be encouraged by giving liberal prizes at one show in each county (not in the same place each year), horses receiving Government money prizes at said shows must travel part of the season where the prizes were awarded. None to compete unless they will travel in said county, if they receive a prize.

(Signed) W. F. KYDD.
GEORGE GRAY.

DISTRICT NO. 8.

Counties.—Glengarry, Dundas, Grenville, Leeds, Frontenac, Lennox and Addington and *Stormont.

Inspectors.—Jas. Sinclair, V.S., Cannington; H. S. Arkell, B.S.A., O.A.C., Guelph, (Glengarry to Leeds); Arthur Thom, Elma, (Frontenac to Addington).

GLENGARRY.

In Charlottenburg township there are three stallions, a Clydesdale, a Hackney and a Standard-bred, all registered and sound and fairly good in conformation. Two stand for $10 and one for $15 service fees. Mares are light in type and are an exceedingly poor lot, averaging 1,100 lbs. This township is somewhat rough and the soil shallow. General purpose horses are in favor, and there are, practically, no heavy horses raised. There is very little system followed in breeding, and very few pure-bred mares in the township. Grade sires are not discriminated against. Light horses are mostly patronized. Carriage and general purpose horses, probably, suit the farmers here best.

Kenyon township is well provided with sires of both heavy and light kinds; the breeds represented being Clydesdales, pure-breds, three; grades, two; Shires, pure-bred, one; Percherons, grades, two; Hackney, pure-bred, one; Coach grades, five; Standard-bred, pure-bred, one; and French Canadians, grades, two. Out of the seventeen, four are unsound and the average quality and conformation is only fair, only a few qualifying as good. Mares are light in type, of poor quality and average 1,100 lbs. in weight. Service fees have a range from $5 to $10.

Not much can be said in favor of the sires standing in Lochiel township, but there is one very good horse. There is one grade, a Percheron, and six pure-breds, four Clydesdales, and two Standard-breds. Six-sevenths are sound. Their service fees vary from $5 to $15; mares are about the same as in the other townships.

Of the four stallions in Lancaster township there is only one really fair pattern of a horse. Three are sound or practically so. Two, an imported Clydesdale and a Standard-bred, are registered, while a Suffolk Punch and a Coach are grades. The grades' fees are $6 and $7, and the pure-breds, $10. Mares are small and poor, and there are very few registered Clydesdale mares.

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* The County of Stormont was inspected by Geo. Gray, Newcastle, and A. R. Walsh, V.S., Perth.

Glengarry—Continued.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	3	1,530	5	All	Good	305	9
Clydesdales, Canadian-bred	6	1,585	6	5	Fair	555	9
Grades, Clydesdale	2	1,400	4	1	Only fair	87	5
Shires, Imported	1	1,800	8	All	Very fair	75	10
Grades, Percheron	3	1,400	6	1	Fair	253	5
Grades, Suffolk Punch	1	1,400	4	All	Fair	92	6
Hackneys, Imported	2	1,400	6	All	Good	215	10
Standard-breds, Imported and Roadsters, Canadian-bred (4 Imported, 1 Roadster)	5	1,210	11	All	Fair	194	11
Grades, Coach	6	1,325	8	4	Fair	400	6
Grades, French Canadian	2	1,325	7	1	Poor	180	6
Totals	31					2,356	

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average weight, pounds.	Average quality.	Average age.
Charlottenburg	210	Light	1,100	Poor	....
Kenyon	1,215	Light	1,100	Poor	....
Lochiel	579	Light	1,100	Poor	....
Lancaster	352	Light	1,200	Poor	....
Total	2,356				

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to	Average fee.
					$			$
Registered Stallions	17	1,344	16	1,219	9	1	125	8
Grade Stallions	14	1,012	8	652	5	6	360	5
Totals	31	2,356	24	1,871	....	7	485	....

Glengarry—Concluded.

The public meeting for the county of Glengarry was held at Alexandria on October 13th, and was attended by about 25 people, principally farmers and breeders. The discussion was good and upon the following lines: the majority favored breeding to Clydesdales sires, which, they say, have been looked upon with disfavour here until the past year or two, but are fast coming into favor now. It was suggested that the Government aid in getting in pure-bred dams, not necessarily imported, and stop all grade stallions from leaving their own stables. The following resolution was carried. "That this meeting favor a license and inspection, also a small fee on all stallions offered for public service." The people here seemed anxious to learn how to breed in the right direction.

Inspectors' Remarks: The greater portion of this county is well suited for raising good, heavy horses, and, in the greater portion of it, the farmers are beginning to wake up and look for a better class of sires. They require better dams also. Only one man was met with, who owned a pure-bred mare.

DUNDAS.

The class of horses and mares in Winchester township is an improvement on that of those in Glengarry county, the quality being better, and there is more good blood in the mares, which, however do not average over 1,100 lbs. The improvement is no doubt due to the fact that for some years a number of Clydesdales, Shires and Hackneys have been imported into the township for sale. There are eighteen stallions in this township, fourteen of them pure-bred and four grades. In regard to breeds they are as follows: Clydesdales, six pure-breds and one grade; one pure-bred Shire; one pure-bred Percheron; five pure-bred Hackneys, a Standard-bred; two grade French Canadians and a grade Coach horse. Nearly a third of them cannot qualify as being sound, and a number of them are not up to the average in conformation and quality. Starting with $5 for a grade, service fees run up to $10.

The quality of the mares in Mountain township is not as good as that of those in Winchester, nor are there so many bred. There are but three sires here, a pure-bred Percheron, and a grade of Clydesdale, and one of Coach breeding. One is unsound, and the average conformation and quality is not good. $6, $8 and $10 are the fees charged, the latter for the pure-bred sire.

Matilda township has only one registered sire, a French Coach horse, but eligibility to register is also claimed for a Clydesdale and a Standard-bred. In addition to these, there are two Clydesdales, a Roadster, and a Coach, all grades, and a grade of no particular breeding. They are all practically sound, but the average is not high in conformation and quality. Service fees for the French Coach horse are quoted as $20; for the rest $5, $6, and $8 are the amounts.

Two grades, a Clydesdale and a Hackney, stand in Williamsburgh township, both sound and of fair conformation. The stud fee is $7 in each case. Mares are of poor type and only fair quality, weighing about 1,050 lbs.

Dundas—Continued.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee. $
Clydesdales, Imported	5	1,670	5	4	Fairly good.	431	10
Clydesdales, Canadian-bred	2	1,600	5	All	Very good	184	9
Grades, Clydesdale	5	1,375	6	4	Only fair	268	7
Shires, Imported and Percherons (1 Shire, 2 Percherons)	3	1,700	3	2	Very fair	236	10
Hackneys, Imported and Grades (5 Hackneys, 1 Grade)	6	1,155	5	All	Fair	707	8
Standard-breds Imported and Grades (2 Pure-bred, 1 Grade)	3	1,090	7	All	Fair	177	7
French Coach Horses and Grades (1 French Coach, 3 Grades)	4	1,325	5	2	Only fair	283	13
Grades, French Canadian	2	1,425	4½	1	Poor	35	5
No Particular Breeding	1	1,175	7	All	Poor	60	5
Totals	31					2,381	

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average weight, pounds.	Average quality.	Average age.
Winchester	1,586	Poor	1,100	Fair	10
Mountain	288	Not very good	1,050	Poor	10
Matilda	415	Poor	1,000	Poor	10
Williamsburg	92	Poor	1,050	Fair	10
Total	2,381				

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee. $	Number of stallions.	Number of mares bred to.	Average fee. $
Registered Stallions	18	1,694	16	1,509	11	2	185	10
Grade Stallions	13	687	9	412	6	4	275	6
Totals	31	2,381	25	1,921		6	460	

Dundas—Continued.

The public meeting for Dundas county, which was held at Winchester on October 18th, was not largely attended. Those present were all good horsemen, and each of the twenty men appeared anxious that something should be done for the improvement of the horse industry. After a general discussion a motion was passed as follows. : "That the Government pass an Act requiring all stallions to be inspected and certificates given after inspection.

Inspectors' Remarks: In this county is found a better class of horses generally than in Glengarry. There are better pure-bred sires, and a greater number of good mares. Farmers are breeding to Clydesdale sires for heavy horses and to Hackneys for light ones. If the farmers have good judgment and continue on in the good way Dundas will soon be ahead of the neighboring counties in the matter of horse-breeding. Its natural advantages are good, and the farmers require a horse with some breeding and substance to work the soil of this county. Hackneys are gaining in popularity, and will probably retain their hold in popular favor. A good many farmers in this county as well as in Glengarry are anxious to secure good pure-bred mares to breed from. This we think a good omen.

Views of two Stallion Owners.

Following are copies of letters received by the Inspectors from two prominent stallion owners in Dundas county who were unable to give their views personally to the Inspectors.

"I have noticed with great pleasure, that our Government is taking steps with a view to the improvement of the horse industry of this Province, and I believe that the result of the investigations being made by yourselves and your confreres, will prove of great value to those interested. I regret exceedingly, that it will be impossible for me to attend any of your meetings in this district, as a previous engagement in London, will prevent my personal attendance to express my own views and learn those of others.

"Will you permit me to place on record, a few matters which my somewhat extended experience in breeding and importing, leads me to think will tend to improve the quality of our stock and will bring adequate rewards to our breeders.

"First, I am strongly of the opinion that a simple and cheap system of registration of all stallions used for stock purposes, is necessary, and that all sires should be registered.

"Second, That every owner of a stallion used for stock purposes should be compelled to take out a license for each horse, under the penalty of not being able to collect stud fees, and, if deemed necessary, a fine for each later offence of using for stud purposes, a horse not registered.

"The above points, I deem to be of vital importance, among the many questions which affect the interests of both breeders and users of the horse."

"I regret that I will be unable to meet you when you visit my place on the 17th, but have instructed my man to give you all information you may require, and being very much interested in the bettering of the breed of horses, in our own Province, and especially in our own county, thought, as I will also be unable to attend the meeting which I see is to be held later on for the purpose of enabling those who have an interest in such betterment of expressing their views on the subject, that I would give them to you on paper.

Dundas—Concluded.

"In the first place—and to my mind the one of most importance—I believe that every stallion standing for public service should be licensed: that in each county, one, or more, veterinary surgeons should be appointed by the Government to inspect such stallions, examine their pedigrees, and report to the individual appointed by the Government to issue such licenses, which should be countersigned by the veterinary surgeon making the inspection.

"These should be produced for the examination of such owners as breed to such horse, and a certificate should be given them by the owner of the stallion, on receipt of service fee, that their mare has been bred to—or is in foal to, as the case may be—his stallion. This certificate should bear the name of the stallion, his particular breed, number in stud book, or name of his sire and dam, and should also state whatever description of the mare, that the owner of her could give.

"These certificates, while not necessary, would be of use in tracing the breeding of horses, would be of advantage in making a sale, and would be a guide to the owner of the mare in regard to her future breeding. They should be printed, with spaces left to be filled in by the stallion owner. A form could be attached to the Government license and copies could be obtained at any country printing office. This would insure their being uniform.

"Secondly, That no stallion should be accepted unless he is of pure breed, and registered in his Stud Book, is a fairly good individual, and sound, in so far as not possessing defects which are capable of transmission.

"A nominal fee, sufficient to cover cost of examination and issuance of license, should be charged.

"With regard to brood-mares, I look upon it as impossible to formulate any regulations that would prevent the breeding of such as are not desirable. A fairly good fee for stallion service would do more than anything else in preventing the breeding of poor, old broken down mares, that are physically unfit to produce sound, vigorous foals, as their owners would know, or would soon find out, that it is poor policy and a financial loss, to pay a good price to have them covered. The licensing of stallions would prevent this to a great extent, if carried out as I have outlined, as no one could afford to pay the price of such a stallion as described, and let it stand at too low a figure.

"In regard to any special breed, that is a matter the breeder will always use his own judgment on, and different conditions require different types of horses. To my mind, every pure type that has been evolved, is good—each for its particular use; otherwise they would not be bred to the high state of perfection they have attained.

"The Government could greatly benefit the farmers and breeders if they could induce the committees of the various Horse Shows now held throughout Ontario—or at least in certain sections—to have a class for green driving or saddle horses that are for sale. Price to be put on each entry by the owner, and this to be taken into account when making the awards. Each entry would be liable to be claimed by any *bona fide* purchaser, at the entered price. Once inaugurated, this would attract buyers from the States as well as other parts of Canada, and would provide means of showing horses to the public. Dealers should be excluded."

GRENVILLE.

Wolford township has nothing but grade stallions, and they are a poor lot, out of the seven, five being practically unsound and others not in very good shape. The breeding represented is, Roadsters, three; French, two; Clydesdale, one; and Coach, one. The cheapest fee is $5, and highest $10. Mares are a poor class of nondescript breeding, not over 1,000 lbs. in weight.

There are ten stallions in Oxford township and of these, three, an imported Shire, an imported Cleveland Bay, and a German Coach horse are pure-bred and fair horses. One of the grades is well up in years. Four grades and a registered sire are unsound. General average conformation is just fair, and fees are the same as in Wolford township. Mares, too, are no better than in that section.

The two stallions, an imported Shire and a grade Roadster, in South Gower are sound or practically so, but not of a high average as regards conformation and quality. They have a uniform service fee of $10. Mares are poor in quality and light in weight.

Not much can be said about the quality of the stallions in Augusta township or of their conformation. Five of the nine are sound, and four of the lot are pure-bred, including two imported Clydesdales. There are four of Clydesdale breeding, including two grades, and five are Standard-breds three being grades. Fees seem pretty uniform in Grenville county from $5 to $10.

There are eleven sires in Edwardsburgh township, but only one pure-bred and two grades are rated as good, two being very good in conformation. The rest are below the average, and three are unsound or practically so. As in the other townships stud fees range from $5 to $10. As regards breeding, there are one imported and two grade Clydesdales, two grade Hackneys, one registered and four grade Standard-breds, and a French grade.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	3	1,550	6	1	Fair	204	9
Grades, Clydesdale	9	1,345	5	6	Fair	621	7
Shires, Imported	2	1,800	4½	All	Pretty fair	204	10
Grades, Percheron and Hackney (1 Percheron, 2 Hackneys)	3	1,240	14	2	Fair	218	8
Standard-breds, Imported	2	1,075	13	1	Only Fair	125	10
Roadsters, Canadian-bred	1	1,100	15	All	Fair	76	8
Grades, Roadster	12	1,020	5	5	Only just fair	212	8
German Coach Horses, Cleveland Bays and Grades (1 German Coach, 1 Cleveland Bay, 1 grade)	3	1,375	9	2	Fair	210	9
Grades, French Canadian	4	1,325	8	1	Only fair	292	8
Totals	39					2,162	

Grenville—Concluded.

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average weight, pounds.	Average quality.	Average age.
Wolford	282	Light	1,000	Poor	10
Oxford	681	Light	1,000	Poor	10
South Gower	72	Light	1,000	Poor	10
Augusta	403	Poor	1,000	Poor	10
Edwardsburgh	724	Poor	1,000	Poor	10
Total	2,162				

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions	10	784	6	496	9	4	288	10
Grade Stallions	29	1,378	15	708	9	14	670	7
Totals	39	2,162	21	1,204	....	18	958	....

The public meeting for Grenville county was held at Kemptville on October 25th. The thirty or more persons present were practically all personally interested in horse breeding, and the discussions of the various questions were very good. The following resolution was moved and seconded, and received nearly the unanimous support of those present: "That all stallions standing for service should be registered as sound, and of good conformation after having passed a rigid inspection."

LEEDS.

Only one pure-bred stallion, an imported Clydesdale, was seen in Elizabethtown township. The rest were grades of Clydesdale, Shire, Percheron, and Roadster blood, one each of the first three and two of the last. None of them are good, and three only of the six are sound. Under the circumstances, the fees of $8 in one case and $10 in the others are fairly good.

The township of Rear of Yonge is a very poor section, and the horses are equally so. There is only one stallion here, a grade Percheron, sound, which stands for a fee of $8. In the township of Front of Yonge, there is, besides one not inspected, also a grade sire of Roadster breeding, and for which a very small fee is charged.

Leeds—Continued.

In Escott township farmers are trying to improve their horse stock somewhat. There was inspected here, only one stallion, a pure-bred Percheron, sound and of fair conformation. Its service fee is $12.

Bastard township contains a registered Standard-bred, a Roadster grade, and a French grade, only one of these three being sound, and none of them of much merit. Five dollars, nine, and ten, are the stud fees charged.

The five stallions whose routes are in North Crosby, are located in or near Westport, and comprise a Percheron and a grade and two Standard-breds and a grade. One of the Standard-breds is described as a very good horse, and two others have fair conformation. Only two-thirds of them, however, are sound. The maximum fee is $12 and minimum $8. Mares are, as is the rule in this and some of the adjoining counties, poor in quality and of a light type, about 1,000 lbs.

A pure-bred Clydesdale, of very good conformation, and a French grade, represent the sires seen in South Crosby. The first named is sound, the owner of the latter was away, and the horse was not seen outside of his stable. The pure-bred stands at $10. There are a great many poor, blemished mares in this section.

Out of the four stallions in Leeds township, two of which are Roadster grades, one an imported Coach, and the other a French grade, only two are sound. One of the Roadsters has the best conformation, the others are just fair. The fee for the Coach horse is $20; other fees are $8 and $10. Mares are a little improvement on those in the rear, as farmers here are giving more consideration to subjects relating to horse-breeding. There is, however, plenty of room for further improvement.

There are six stallions in the township of Lansdowne, but only two of these were inspected, these being a pure-bred Clydesdale and a grade Percheron. The former is aged. One of them is unsound. The grade has the bigger stud fee $8. That of the other is $7.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	2	1,500	13	1	Fair	157	8
Clydesdales, Canadian-bred	1	1,650	5	All	Very good	85	10
Grades, Clydesdale and Shire (1 Clydesdale, 1 Shire)	2	1,350	5	....	Only fair	110	9
Percherons	2	1,675	5½	1	Fair	178	12
Grades, Percheron	4	1,400	7	3	Poor	152	9
Standard-breds, Imported	3	1,055	9	2	Fair	204	10
Grades, Roadster	7	1,045	7	5	Rather good.	244	8
French Coach Horses	1	1,175	3	All	Fair	....	20
Grades, French-Canadian	3	1,380	6	2	Fair	36	5
Unenumerated	5	....	......	....	....	....	......
Totals	30					1,166	

Leeds—Continue

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average weight, pounds.	Average quality.	Average age.
Elizabethtown	235	Light	1,000	Poor	10
Rear of Yonge	15	Light	1,000	Poor	10
Front of Yonge	12	Light	1,000	Poor	10
Front of Escott	103	Light	1,000	Poor	10
Bastard	227	Light	1,000	Poor	10
North Crosby	281	Light	1,000	Poor	10
South Crosby	85	Light	1,050	Poor	10
Leeds	112	Light	1,050	Poor	10
Front of Lansdowne	96	Light and poor	1,050	Very inferior	12
Total	1,166				

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions	9	624	6	454	12	3	170	9
Grade Stallions	16	542	10	262	7	6	280	7
Unenumerated	5	....	....	....	....	....	....	....
Totals	30	1,166	16	716	....	9	450	....

The public meeting at Lansdowne on October 31st, was well attended, considering the weather, and other adverse conditions; about 25 or 30 men, principally stallion owners being in attendance. The discussion was very good.

The following resolution was adopted: "That stallions in the county be inspected by a competent Inspector, and that all stallion owners whose horses do not pass inspection be given one year to dispose of them, and, after that date, all stallions that are advertised for service must be registered and pass inspection as to conformation, soundness and freedom from transmissable defects." This was carried by a vote of nine for, to four against. The others did not vote.

In addition to the motions favoring inspection and registration passed at the Lansdowne meeting, the opinions obtained from prominent horse breeders and others interested in horses residing near Brockville all tend to show the Governmental registration would be welcomed by them as tending to improve the quality of the horses in this county.

Leeds—Concluded.

Inspectors' Remarks: The mares are an exceedingly poor class, light, and very few good young mares are bred. Farmers do not think of breeding a mare until it is unfit for work, old, decrepit and unsound. This is an exceedingly poor county for mares, and we did not see one good sound pure-bred mare of any class used for breeding.

FRONTENAC.

Kingston township farmers evidently pin their faith almost entirely to the light breeds as there are a pure-bred and a grade Hackney, a Standard-bred and four Roadster grades, and one pure-bred Clydesdale standing for service here. No less than one-half are not sound, and are not likely to be successful sires. Conformation is rather poor on the whole. Service fees are $8 to $15. Mares average 1,000 lbs., are light in type and poor in average quality.

The two stallions, a Clydesdale and a Percheron, both pure-bred and sound, standing in Pittsburg township are two pretty fair horses. Service fee is $10. Mares are practically of the same type as in the previous township.

Two stallions were inspected in Storrington township, a pure-bred Percheron and a grade Shire.

Mares are very poor in Loughborough township, their average weight being given as 900 lbs., and quality poor. The three stallions found here, too, are not of good type, and two are unsound. All are pure-bred, being two Standard-breds, and a Clydesdale. Six dollars to $10 is the variation in fees.

Portland township has all grades for sires, two Roadsters, a Clydesdale, and a French Canadian. One half of them are sound, and they have fair conformation. Three stand for service at $8 and one for $15. Mares are very poor and light.

The only stallion inspected on Wolfe Island was a pure-bred French Coach horse of fair conformation, standing at $20, and also sound. The Inspectors were told that there were a great many common, nondescript stallions kept here, which serve all the mares they can at any price obtainable during the season. They are then put to work. The horses and mares are very inferior, and a great many unsound, and the people quite ignorant of breeding principles. This Island would be an ideal breeding ground if farmers gave more attention to breeding. Four stables were visited, but the owners and the horses were away from home.

Bedford township is poor and rocky, and the mares are very inferior. There is a pure-bred Canadian Clydesdale, serviceably sound. Its fee is $9.

A grade Shire and a grade Coach travel in Oso township; one being unsound. Six dollars and $4 are their respective fees. Mares, too, are poor, and the country rough and stony.

Olden township, also, has two grades, both of French blood, one of them unsound. Four dollars and $5 are the fees.

Kennebec, another of the rear townships, has one grade Clydesdale stallion on service.

Three of the six sires in Hinchinbrooke township were not inspected. The other three are a pure-bred Clydesdale, a grade of the same breed, and a French grade. Only one is sound, and none of them are very good.

Frontenac—Continued.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported and Canadian-bred (1 Imported, 4 Canadian-bred)	5	1,560	7	4	Fair	407	10
Grades, Clydesdale	3	1,380	5	1	Poor	141	9
Grades, Shire	2	1,250	4	....	Poor	99	5
Percherons	2	1,650	3½	1	Fair	66	15
Hackneys, Imported and Grades (1 Hackney, 1 Grade)	2	1,150	10	All	Fair	97	10
Standard-breds, Imported and Roadsters, Canadian-bred (2 Imported, 1 Canadian-bred)	3	1,110	9	1	Fair	152	11
Grades, Roadster	6	1,100	8	2	Fair	253	9
French Coach Horses and Grades (1 French Coach, 1 Grade)	2	1,250	4	All	Fair	68	12
Grades, French-Canadian	4	1,150	11	1	Fair	229	6
Unenumerated	3	....	......	......	....	....	....
Totals	32					1,512	

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average weight, pounds.	Average quality.	Average age.
Kingston	358	Light	1,000	Poor	10
Pittsburg	137	Light	1,000	Poor	10
Loughborough	181	Light	900	Poor	10
Storrington	81	Light	1,000	Poor	10
Portland	240	Light	900	Poor	10
Wolfe Island	46	Light	900	Very inferior	10
Bedford	112	Light	1,050	Poor	10
Oso	106	Light	1,000	Poor	11
Olden	60	Light	1,000	Poor	10
Kenebec	51	Light	900	Poor	12
Hinchinbrooke	140	Light	900	Poor	12
Total	1,512				

Frontenac—Concluded.

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions.	12	726	8	466	9	4	260	10
Grade Stallions	20	786	9	375	7	11	411	8
Total.........	32	1,512	17	841	....	15	671	....

The public meeting at Harrowsmith was held on November 5th, but not such a good meeting as previous ones, the discussion not being along such practical lines. Farmers in this section do not seem to appreciate breeding as they should.

The following resolution was moved: "That all stallions offered for service shall be inspected by a competent inspector, for soundness and conformation, and also be registered in a local register." An amendment was moved: "That all stallions offered for service be inspected by a competent Inspector for soundness and conformation, and must also be eligible for registration in their respective record books." The motion carried by 14 to 13.

Inspectors' Remarks: This meeting was by no means a representative one of the county. This particular locality is very much behind the times in horse breeding. Kingston horsemen are almost unanimous in asking for registration and inspection or license. All over the county the good men of the business favor a change from the present situation. Horses and mares are both of a very inferior quality in this county. Some of the syndicate stallions here are a disgrace.

LENNOX AND ADDINGTON.

While most of the townships have a rather inferior lot of mares, Camden East has the best average lot, the mares here being a little heavier than in the other townships. In such a wide district with but poor railroad facilities, it is probable that some of the stallions in the back townships were overlooked, but certainly nearly all were seen. The majority of the stallions in Camden are unsound and of poor conformation. Service fees are fairly good under the circumstances, viz., $8 to $15. Mares are of medium type, but of poor average quality. There are three registered stallions, and one grade Clydesdale, a pure-bred Shire, a grade Hackney and four Roadster grades.

Two grade Clydesdales and a grade Roadster make up the list of sires in Sheffield township, and of these one of the former is a pretty fair horse with good conformation. One is unsound. Service fees are $8 and $10. Mares are of a very poor quality and do not average more than 1,000 lbs. in weight.

Lennox and Addington—Continued.

No less than eight out of sixteen stallions travelling in Richmond township have to be recorded as unsound, and there are only a few that come up to the requirements of a satisfactory sire. The breeds represented are two registered and five grade Clydesdales, a Percheron, two Standard-breds and three grades, a Thoroughbred, a grade Coach horse, and a grade of French breeding. Farmers can avail themselves of sires at fees ranging from $5 to $15, the latter being for a Standard-bred. Not only are mares of poor quality, but fully 25 per cent. of those bred are unsound.

Two-thirds of the stallions in North Fredericksburg township are sound, but that is about all that can be said of them in connection with their value as sires. There are three Percherons and three grade Clydesdales here, standing at fees as low as $2 for one grade and up to $15 for a pure-bred. Mares average slightly higher than in the previously mentioned townships of these counties, being about 1,200 lbs. in weight. Their quality, however, is no better.

Mares drop off again in weight in Adolphustown township. There are only three stallions here, one of which was away from its stable when the Inspectors called. One horse is unsound, and another one is very old. The sires are Roadster grades, and the only service fee given is $10.

There is no improvement in the quality or conformation of the sires in Ernestown township, nor as regard their soundness, for only one-third are sound. There are two pure-breds, a Hackney and an English Coach horse. The other four are composed of three grade Clydesdales and a grade Roadster. Mares are poor and light in type. As this is a good section of country, there is no reason why good horses could not be raised here, if farmers were inclined to do so.

In South Fredericksburg, three stallions were inspected, a registered Thoroughbred, and a Clydesdale grade, and a Roadster grade. There is the same report as to mares, being light in type and poor in quality, a state of things which need not be, as there is much good land here and the breeding of good horses would be profitable, especially heavy ones.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported and Canadian-bred (1 Imported, 4 Canadian-bred)	5	1,600	8	3	Fair	455	12
Grades, Clydesdale	15	1,350	6	7	Not even fair	734	6
Shires, Imported and Percherons (1 Shire, 4 Percherons)	5	1,800	7	2	Just fair	511	14
Hackneys, Imported and Grades (1 Hackney, 1 Grade)	2	1,175	5	1	Good	117	10
Standard-breds, Imported	2	1,075	11	1	Only fair	130	13
Grades, Roadster	13	1,055	7	8	Fair	361	8
Thoroughbreds	2	1,050	11	....	Fair	12	10
English Coach Horses and Grades (1 English Coach, 1 Grade)	2	1,350	14	1	Fair	141	8
Grades, no particular breeding	1	800	24	....	Poor	....	....
Unenumerated	2	....	....	....	....	....	....
Totals	49					2,461	

Lennox and Addington—Concluded.

MARES.

Townships.	Number of mares bred to stallions in township.	Type.	Average weight, pounds.	Average quality.	Average age.
Camden, East	570	Medium	1,200	Poor	10
Sheffield	219	Light	1,000	Poor	10
Richmond	812	Light	1,050	Poor	10
North Fredericksburg	451	Medium	1,200	Poor	10
Adolphustown	20	Light	1,000	Poor	10
Ernestown	249	Light	1,050	Poor	10
South Fredericksburg	140	Light	1,050	Poor	10
Total	2,461				

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions	16	1,184	8	598	12	8	586	12
Grade Stallions	31	1,277	15	642	7	16	635	8
Unenumerated	2	....	....	....	....	....	....	....
Totals	49	2,461	23	1,240	....	24	1,221	....

The public meeting for Lennox and Addington was held on November 13th, at Napanee, and was attended by about twenty-five people. There was a fair discussion, and it was moved, "That in case the Government pass legislation prohibiting non-registered stallions standing for service, stallion owners receive compensation for those horses that do not fulfil the requirements."

It was moved in amendment: "That all stallions offered for service shall be pure-bred, registered in their respective books, of good conformation and sound." The amendment was carried.

Inspector's Remarks.—Lennox and Addington should be the breeding ground of good horses, inasmuch as there is plenty of good land and good water, but like all the eastern part of Ontario, there is a great lack of good mares. Farmers breed indiscriminately, crossing and re-crossing with no ultimate object in view, instead of trying to make each successive cross an improvement. Many of the farmers are unable to distinguish between true and bogus pedigrees, and can, therefore, be easily imposed upon by unscrupulous persons. Ignorance is widespread. Education is the watchword and remedy.

Special Report of Inspectors.

The condition of the horse-breeding industry in District No. 8 was perhaps in a more backward state than the Inspectors were prepared to find it. We found a number of serviceable animals of what may be termed the general-purpose sort, but there was a marked absence in the district of market horses of each and every class. Of really good draught animals there were practically none, and the average of the Clydesdale, Shire, and Percheron grades was distinctly light in weight, and on the whole they were not of high quality. It was observed that a very large number of the horses of the district carried in their veins a noticeable percentage of trotting bred and French Canadian blood and were of corresponding conformation. The blood of the various breeds had, however, been so intermixed that no uniform type had been evolved, nor had any high standard of excellence been reached through the policy of breeding that had been followed. It may be remarked in passing that through the enterprise of certain importers and breeders in buying and using superior sires in a few townships in Dundas and Glengarry counties, there was a noticeable improvement over the average of the horses of the district. In the county of Glengarry both heavy and light horses are raised, but the former are more suitable and profitable. The difficulty in this county, as throughout the seven counties we traversed, is that breeders have not got heavy enough mares. This difficulty could be overcome by the importation of heavy mares, and in the opinion of some the Government might with advantage give pecuniary assistance for that purpose.

In no mistaken terms did a goodly number pronounce against the so-called general purpose horse that was permitted to travel the road for service to-day. There is no doubt that many of them should be barred out entirely or compelled to stay at the owner's stable. If this were done the better horses would almost invariably be used, and, as a consequence, a superior breed of horses would be raised and a better price be obtainable.

One point the people were all agreed upon, namely that there were a number of horses travelling the country that were a detriment rather than a help to the horse-breeding business.

In the popularity of the dairy industry in Eastern Ontario, in the lack of information among the farmers as to what constitutes real merit in horses, in the practice of indiscriminate breeding, and in the use of inferior breeding stock of both sexes, reasons may be found for the somewhat backward condition of the horse breeding business in the counties under consideration. The higher prices paid for horses within the last few years, together with the intelligent enterprise of a number of breeders in introducing a better class of stallions, have, however, awakened a very general interest in horse-breeding which should be the promise of a marked advancement in the near future. The movement undertaken by the Government to promote the horse interests in the Province has been, we think, a timely and popular one, and almost without exception the commissioners were cordially and courteously received by horsemen of the district. Under the advice of our instructions we attempted to gain the confidence of the stallion owners, and were repaid by generous treatment at their hands, and a ready response in an expression of opinion in answer to the questions asked. While large numbers did not attend the public meetings, these did not lack interest, and the attitude of these metings would, we think, be a fair gauge of the opinion of the horsemen of the whole district. This opinion is perhaps stated with sufficient clearness in the main body of the report, and need not be repeated here.

Report Inspectors' District 8.—Concluded.

Your Inspectors beg to offer one or two suggestions by way of a summary relative to the information gathered while on this tour of inspection.

Supported by the opinion of many horsemen with whom we had conversation, we believe that the passing of a stallion License and Inspection Act would meet with very general approval, provided that it was reasonably moderate in its requirements. Horsemen are unanimous in their condemnation of the scrub sires that travel the country. We think, however, that an arbitrarily prohibitive act would be reactionary in its effect, and consequently would not produce the result desired. The greatest benefit must probably be brought about in an educative way. A system of Government inspection and registration of stallions should be practicable and desirable. A small registration fee might be charged to cover the cost of inspection, but we think the stallion owner should not be required to suffer the hardship of a high license fee. A certificate of registration, includng the finding of the Inspector as to soundness, utility, purity of breeding, etc., might be furnished each stallion owner, and he be required to publish such certificate in a conspicuous place on all bills, posters and advertising matter used by him. All stallions might be required to be registered and certain restrictions relative to eligibility for registration might be sufficiently prohibitive in its effect in retiring from active service undesirable animals. A catalogue of stallions in the different counties including an abridged statement of the inspector's report on each registered animal; and which could be obtained on application, would furnish useful information to the horsemen of the various districts. We think further that actual breeders should be protected against misrepresentation on the part of stallion owners in their being compelled to publish true statements of the breeding of their horses, together with the Government registration certificate on all advertising matter used by them. Breeders have been the victims of much fraud on the part of unscrupulous grooms, and should be protected against such misrepresentation. There might further be an advanced registry for superior stallions of approved merit and breeding, and the question of bonusing such stallions as would qualify might not be unwisely considered. We think, moreover, that the benefit of such an Act might be supplemented by the issuing of an up-to-date bulletin giving information not only as touching breeds and breeding, but as well upon markets, types, and classification of horses generally.

As regards syndicating, where a small syndicate of three, four or six persons, agree among themselves to buy a horse and go to a good reliable importer, we found this system to work all right. We asked for suggestions as to how to overcome the evil of syndicating stallions, but got no satisfactory answers. In our opinion the people are not educated, or rather are not good enough judges, to buy on their own judgment. Education is the most needful thing. This we think, can be partially done through the Farmers' Institutes, and through the employment of good men as judges at Agricultural Fairs.

The farmers as a rule, are not particular enough about breeding good mares. A great majority sell the good mares and breed the infirm and blemished ones, and also those unsound from diseases that are transmissable. This class of mares bred to a cheap, unsound, short-bred, nondescript stallion cannot help but produce poor offspring. If the breeders and farmers could only be taught to breed so that each succeeding cross would be one better than the previous, we would soon have a much better class of horses in Canada.

(Signed) Jas. Sinclair.
H. S. Arkell.

*STORMONT.

The general run of mares here were found to be of a light type and of very inferior quality. The majority of the sires are of the lighter kinds, but there is a fair sprinkling of heavy sires in every township except Osnabruck.

In Cornwall township there are seven stallions, all but one having their headquarters in the town of Cornwall. One is a registered Clydesdale, another a Percheron, and there are two Standard-breds, (one of which was not seen owing to the owner's absence), and three French grades, two of which are not used for service. For the other French grade, the fee is $5. while for the pure-breds it is $10. One of those used for service is unsound.

All the stallions in Osnabruck township are grades, and the breeding is as follows: Standard-breds, six; French Canadians, three. One of the former is unsound, and the average conformation is deficient. Fees are very low, being $4, $5, and $6.

There are six stallions in Roxborough township, but one of these appears among the horses in Glengarry. Of the remaining five one is a registered Clydesdale and one grade. There is one pure-bred Percheron and one grade, and there is also a French grade. Four are sound, but average conformation is only fairly good. The fees vary from $4 to $10.

Five grades of Standard-bred, Clydesdale, Percheron, and French Canadian breeding stand in Finch township, there being two of the first, and one each of the other three. Besides these there was another stallion which died recently. Another stallion has not done any service. There are two unsound horses and average conformation is only fairly good. $5 and $6 represent the service fees.

STALLIONS.

Breeding.	Number.	Average weight, pounds.	Average age.	Serviceably sound.	Average conformation.	Number of mares served.	Average service fee.
							$
Clydesdales, Imported	2	1,675	6½	All....	Fairly good.	156	10
Grades, Clydesdale	2	1,550	6	All....	Good.......	74	6
Percherons	2	1,775	5½	All....	Fairly good.	203	10
Grades, Percheron	2	1,350	7	1......	Only fair ...	107	5
Standard-breds, Imported, and Grades (1 Pure-bred, 9 Grades).	10	1,030	6	8......	Just fair....	239	7
Grades, French Canadian.........	7	1,235	6	5......	Fair........	418	5
Unenumerated....................	1	....	......	....	....	....	....
Total	26					1,197	

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* This county was inspected by George Gray, Newcastle, and A. R. Walsh, V.S., Perth.

Stormont—Concluded.

MARES.

Townships.	Number of mares bred to stallions inspected in township.	Type.	Average quality.
Cornwall	281	Light	Inferior.
Osnabruck	314	Light	Inferior.
Roxborough	420	Light	Inferior.
Finch	182	Light	Inferior.
Total	1,197		

MARES BRED TO DIFFERENT CLASSES OF STALLIONS.

Stallions.	Total.		Serviceably sound.			Not serviceably sound.		
	Number of stallions.	Number of mares bred to.	Number of stallions.	Number of mares bred to.	Average fee.	Number of stallions.	Number of mares bred to.	Average fee.
					$			$
Registered Stallions..	5	384	5	384	10	....	....	....
Grade Stallions......	20	813	15	477	6	5	336	5
Unenumerated......	1	....	....	....	....	....	....	....
Totals	26	1,197	20	861	....	5	336	....

Summary for the Province showing by Counties the number of "serviceably sound" and also "not serviceably sound" registered and grade stallions and the number of mares bred to them.

Name of County.	Registered stallions serviceably sound.		Registered stallions not serviceably sound.		Grade stallions serviceably sound.		Grade stallions not serviceably sound.	
	Number of stallions.	Number of mares bred.	Number of stallions.	Number of mares bred.	Number of stallions.	Number of mares bred.	Number of stallions.	Number of mares bred.
Bruce	50	4,563	16	1,408	18	1,162	4	237
Brant	18	1,270	1	....	16	691	7	233
Carleton	29	1,860	11	823	21	1,036	3	93
Dufferin	18	1,604	....	....	9	403	1	35
Dundas	16	1,509	2	185	9	412	4	275
*Durham	68	3,909	13	262	12	350	2	33
Essex	36	2,728	....	....	15	834	1	65
Elgin	43	2,775	1	70	11	305	......	......
Frontenac	8	466	4	260	9	375	11	411
Grenville	6	496	4	288	15	708	14	670
Glengarry	16	1,219	1	125	8	652	6	360
Grey	74	5,892	15	1,403	21	1,290	5	272
Haldimand	17	1,452	2	227	26	1,318	3	163
Halton	15	986	6	230	12	708	1	35
Huron	86	7,492	12	1,112	14	619	2	235
Hastings	20	1,429	6	248	32	1,709	6	206
Kent	48	3,469	4	204	18	1,118	1	25
Lambton	53	5,096	....	....	27	1,469	......	......
Lincoln	10	716	1	40	13	495	......	......
Lanark	19	1,441	1	27	10	470	3	155
*Leeds	6	454	3	170	10	262	6	280
*Lennox & Addington	8	598	8	586	15	642	16	635
Middlesex	99	7,287	....	....	21	1,087	1	25
Norfolk	41	2,216	....	....	29	1,522	4	265
Northumberland	28	1,547	4	360	26	1,122	4	102
Oxford	47	2,734	....	....	28	1,359	7	98
Ontario	104	4,397	2	179	7	399	......	......
Perth	78	6,125	....	....	13	641	4	141
Prince Edward	12	717	3	149	18	790	9	356
Peterborough	28	1,572	4	168	21	820	9	204
Peel	44	2,073	4	331	17	554	......	......
Prescott	11	679	....	....	34	1,298	2	85
Russell	18	1,304	....	....	20	999	3	29
Renfrew	24	1,642	4	120	24	1,394	5	299
Simcoe	81	5,991	8	624	29	1,413	2	65
*Stormont	5	384	....	....	15	477	5	336
*Victoria	45	1,975	7	337	16	421	2	135
Welland	12	859	1	50	15	534	......	......
Waterloo	46	2,016	4	340	10	468	......	......
Wentworth	28	1,262	2	9	18	1,091	2	128
Wellington	94	7,112	10	520	25	997	7	325
*York	106	4,793	5	370	13	788	1	116
Totals	1,615	108,109	169	11,225	740	35,202	163	7,127

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* *Unenumerated.*—Durham, 4 ; Leeds, 5 ; Lennox and Addington, 2 ; Stormont, 1 ; Victoria, 8 ; York, 9.

Summary for the Province showing by Counties the per cent. of "serviceably sound" and also "not serviceably sound" registered and grade stallions and the per cent. of mares bred to them.

Name of County.	Registered stallions serviceably sound.		Registered stallions not serviceably sound.		Grade stallions serviceably sound.		Grade stallions not serviceably sound.	
	Per cent. of stallions.	Per cent. of mares bred.	Per cent. of stallions.	Per cent. of mares bred.	Per cent. of stallions.	Per cent. of mares bred.	Per cent. of stallions.	Per cent. of mares bred.
Bruce	57	62	18	19	20	16	5	3
Brant	43	58	2	....	38	31	17	11
Carleton	45	49	17	22	33	27	5	2
Dundas	52	63	6	8	29	17	13	12
*Durham	69	86	13	6	12	7	2	1
Dufferin	64	78	....	....	32	20	4	2
Essex	69	75	....	....	29	23	2	2
Elgin	78	88	2	2	20	10	......	......
Frontenac	25	31	13	17	28	25	34	27
Grenville	16	23	10	13	38	33	36	31
Glengarry	52	52	3	5	26	28	19	15
Grey	65	67	13	16	18	14	4	3
Haldimand	35	46	4	7	54	42	7	5
Halton	44	50	18	12	35	36	3	2
Huron	75	79	11	12	12	7	2	2
Hastings	32	40	9	7	50	47	9	6
Kent	68	72	6	4	25	23	1	1
Lanark	58	70	3	1	30	22	9	7
Lambton	66	78	....	....	34	22	......	......
Lincoln	42	57	4	3	54	40	......	......
*Lennox & Addington	16	24	16	24	31	26	33	26
*Leeds	20	39	10	15	33	23	20	23
Middlesex	82	87	....	....	17	13	1	......
Norfolk	55	55	....	....	39	38	6	7
Northumberland	45	50	6	11	42	36	7	3
Oxford	57	65	....	....	34	33	9	2
Ontario	92	88	2	4	6	8	......	......
Perth	82	89	....	....	14	9	4	2
Prince Edward	29	36	7	7	43	39	21	18
Peterborough	45	57	6	6	34	30	15	7
Peel	68	70	6	11	26	19	......	......
Prescott	24	33	....	....	72	63	4	4
Russell	44	56	....	....	49	43	7	1
Renfrew	42	48	7	3	42	40	9	9
Simcoe	67	74	7	8	24	17	2	1
*Stormont	19	32	....	....	58	40	19	28
*Victoria	58	68	9	12	21	15	2	5
Welland	43	59	4	4	53	37	......	......
Waterloo	76	72	7	12	17	16	......	......
Wentworth	56	51	4	....	36	44	4	5
Wellington	70	79	7	6	18	11	5	4
*York	79	79	4	6	10	13	1	2
	60	67	6	7	28	22	6	4

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* *Unenumerated.*—Durham, 4 per cent.; Lennox and Addington, 4 per cent.; Leeds, 17 per cent.; Stormont, 4 per cent.; Victoria, 10 per cent.; York, 6 per cent.

Summary for Province, showing by breeding the number of Imported, Canadian-bred, and Grade Stallions, the number of mares bred to them and the average service fees.

Breed. (Including Grades of same breed.)	Imported stallions.						Canadian-bred stallions.						Grade stallions.						Total.	
	Serviceably sound			Not serviceably sound.			Serviceably sound			Not serviceably sound.			Serviceably sound			Not serviceably sound.				
	Number of stallions.	Number of mares bred to.	Average service fee.	Number of stallions.	Number of mares bred to.	Average service fee.	Number of stallions.	Number of mares bred to.	Average service fee.	Number of stallions.	Number of mares bred to.	Average service fee.	Number of stallions.	Number of mares bred to.	Average service fee.	Number of stallions.	Number of mares bred to.	Average service fee.	Number of stallions.	Number of mares bred to.
			$			$			$			$			$			$		
Clydesdale	538	42,340	11	43	3,406	11	263	17,484	9	35	2,444	9	225	12,036	8	43	2,100	8	1,147	79,810
Shire	75	5,866	12	16	1,454	12	8	481	10	......	......	....	20	1,354	9	9	562	8	128	9,717
Percheron	132	9,931	12	14	1,072	13	8	638	10	1	71	8	44	2,288	8	11	567	6	210	14,567
Belgian	9	736	12	4	378	11	......	......	....	......	......	....	5	307	8	2	115	8	20	1,536
Suffolk Punch	12	502	11	1	50	11	......	......	....	......	......	....	1	92	6	....	....	....	14	644
Hackney	123	7,671	13	7	180	15	16	1,247	14	2	24	11	25	1,065	10	1	69	8	174	10,256
*Standard-bred	203	10,238	14	23	1,245	12	114	5,315	11	11	540	9	256	8,863	9	63	2,126	8	670	28,327
Thoroughbred	50	1,621	12	7	262	11	8	185	13	3	9	15	9	361	10	1	35	6	78	2,473
German Coach	17	1,353	11	1	90	10	......	......	....	......	......	....	....	....	....	....	....	....	18	1,443
English Coach	10	676	10	......	......	....	......	......	....	......	......	....	....	....	....	....	....	....	10	676
French Coach	6	377	16	......	......	....	......	......	....	......	......	....	....	....	....	....	....	....	6	377
French Draught	2	152	12	1	......	....	......	......	....	......	......	....	....	....	....	....	....	....	3	152
Coach breeding	......	......	....	......	......	....	......	......	....	......	......	....	60	3,369	8	15	710	7	75	4,079
French Canadian	......	......	....	......	......	....	16	1,241	9	......	......	....	68	4,334	8	13	766	7	97	6,341
Miscellaneous	5	55	13	.. ..	......	....	......	......	....	......	......	....	27	1,133	7	5	77	8	37	1,265
Totals	1,182	81,518	....	117	8,137	....	433	26,591	....	52	3,088	....	740	35,202	....	163	7,127	....	2,687	161,663

* Including those classified as Roadsters.

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SECOND ANNUAL REPORT

OF THE

POULTRY INSTITUTE

OF THE

PROVINCE OF ONTARIO

1906-7

(Published by the Ontario Department of Agriculture, Toronto.)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO
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1907.

WARWICK BRO'S & RUTTER, Limited, Printers,
TORONTO.

To the Honourable WILLIAM MORTIMER CLARK, K.C., *Lieutenant Governor of the Province of Ontario.*

MAY IT PLEASE YOUR HONOUR:

The undersigned begs to present herewith for the consideration of His Honor the Report of the Poultry Institute for 1906-7.

Respectfully submitted,

NELSON MONTEITH,
Minister of Agriculture.

TORONTO, 1907.

POULTRY INSTITUTE OF ONTARIO,

1906-7.

TO THE HON. NELSON MONTEITH,

Minister of Agriculture for the Province of Ontario.

SIR,—I have the honor herewith to present the Report of the second annual meeting of the Poultry Institute, held at the Ontario Agricultural College, during the month of February. From beginning to end the meeting was a complete success. Poultry men came from all over the Province and remained until the closing session. We were also able to secure the attendance of prominent poultry men from the United States, who are engaged in this business, and they freely gave us the benefit of their experience.

We believe this Report will make valuable reading matter for the farmers of Ontario, and we recommend that it be published. All of which is respectfully submitted.

I have the honor to be, Sir,

Your obedient servant,

G. C. CREELMAN,
President.

GUELPH, February 23, 1907.

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POULTRY INSTITUTE.

The second annual Poultry Institute of the Province of Ontario convened in the Agricultural College, Guelph, on Tuesday, February 5th, 1907, at 2 o'clock p.m.

Mr. L. H. Baldwin, of Toronto, was elected Chairman, and opened the proceedings with the following remarks: I felt very pleased to be the chairman of the first Poultry Institute of the Province, and I wish to thank you for placing me in the chair for another term. The success of a meeting of this kind depends on the amount of good, practical knowledge that you get out of the speakers. My experience leads me to believe that probably the very best work you will get out of the speakers is what you draw out of them yourself; so I cannot urge upon you too strongly to make close notes of any point that might suggest itself to you while the speaker is addressing you. Most speakers—in fact, all the speakers— will not object to your interrupting them or breaking in on their thread of conversation to answer questions; but if you feel diffident about doing it, make a note of it in a book, and when the speaker has finished, let us have the questions rapid and to the point.

SELECTING LAYING HENS.

By W. R. Graham, O.A.C., Guelph.

I regret to have to inform the meeting that Prof. G. M. Gowell, of Orono, Maine, who was to address you this afternoon, is unable to be present, owing to illness. The first item of Prof. Gowell's talk was "Selection of Laying Hens." We have not done as much work here on the selection of layers as has been done on the Maine Experiment Station. Probably no other Experimental Station has done as much work along the line of trap nesting as Maine has done. With our work there are two or three points which appear to be quite prominent and worthy of serious consideration. One of these is that each bird has its own individuality. By that I mean that there are certain birds which lay eggs that are nearly always hatchable. With one hen we found that she was a good layer, a hen that laid fertile eggs, but the eggs were not hatchable under hens or in incubators. One peculiarity of these eggs was that the chick would develop only to about the eighteenth day, or we always found a fully formed dead chick in the shell. We call that a fertile egg, but it is an unhatchable egg. We have also found other hens that will lay equally as many eggs that are nearly all hatchable under natural conditions, but they are not as hatchable under artificial conditions. There are a few hens, and I am sorry to state that they are in the minority, whose eggs are hatchable under almost any condition. In other words, these hens in the latter class seem to have so much vitality, and their eggs are so strongly fertilized, that they will stand abuse in the way of temperature and other conditions that are present in some methods of incubation, and yet will hatch a chicken that is fairly thrifty.

In selecting birds one has several objects in view. We all know the saying that "A hen that lays is the hen that pays." I do not think there are many people in the poultry business but who believe that the egg production is the best end of the business. It is probably the surest. You are not taking as many risks as you are in the production of broilers, for instance; and if you increase the egg production of each individual hen five or ten eggs a year, you are doing a good business. I find it is a very difficult matter to get an accurate idea of the number of eggs that the average hen in the Province of Ontario produces in a year. I am very much inclined to believe that the average hen does not produce eighty eggs in twelve months. I believe the average hen on the average Experiment Station does not produce 110 eggs per year. One would naturally expect that upon the various Experiment Stations and Colleges which are scattered over the United States and Canada that they would get probably as good an average production as on the average poultry farm. They have many conditions present which are detrimental to the production of eggs, which are not present on the average farm, and they have other conditions that are probably more favorable. Considering all things, we should get somewhere near the average production on the Experiment Station.

I have come to the conclusion that the average production is somewhere about 100 eggs. In Maine they had a production of 120 eggs per hen on an average. They have been working on the trap nest system for a number of years, and, as far as I know, their record last year was 134 eggs per hen, which means that they had a gain of about fourteen eggs per hen over earlier records. I think that you can produce a wonderful improvement by selection in the first one or two years, and after that progress becomes slow. You must have a great many conditions favorable to make advancement. From what Prof. Gowell has told me, they have not used any males in their breeding pens that have not been produced from hens that produce less than 200 eggs per hen per year. All the hens in their breeding pens have been bred from hens that laid 160 eggs per year, so they might be termed strong producers. No hen is used for breeding purposes until after her egg record had been known for twelve months. In addition to all this, a great deal, undoubtedly, can be done by selecting from outward appearance. There are a great many methods advertised in various pamphlets and papers stating that if you will practise this or that method of selecting as laid down in the paper that you will be able to select the drones from the workers.

Q.—Would you advise a man to go by the Hogan system?

A.—The results so far have not been very satisfactory to me.

Q.—How has it acted with you?

A.—From what I can observe in the use of the Hogan system, you can go into the flock and pick out the hens that are laying at that time. We carefully examined 160 hens and pullets at the time we put them into the experimental pens; we took each pullet and examined her according to the Hogan system, and then wrote her rating in a book. For instance, No. 49, we would write opposite her number how well matured she was and what we rated her egg production would be.

Q.—That is according to the system?

A.—Yes. I went over these hens and pullets myself in the month of November, and also had my assistant, Mr. Terry, go over them. In comparing our estimates with the trap nest records, in some instances we were right and in some instances we were badly mistaken. I cannot say the system is a failure, because I know that you can go into a flock and by its use pick out the hens that are laying, but probably by keen observation a man could do the same thing. We wished to be able to select the good layers from among the pullets in October or November, but the system so far has not been a success for this purpose.

One year Prof. Gowell selected from a large number of pullets fifty which appeared to be more matured than their mates. They began to lay earlier than their mates. These pullets had probably grown faster and matured earlier. They were selected and put in a pen by themselves and kept there for their year's record. These made an average egg yield of 180 eggs per hen per year, while the average of the entire flock flock was about 134. This goes to show the correctness of the idea that has been advanced by many writers, that hens which mature early and have good constitutions are likely to be the best layers. I have also found in our work that pullets that begin to lay in November and December, or probably January, in nearly all instances make a higher egg yield for twelve months than those that begin to lay in March or April.

Q.—Does that apply to the second year, as well as the first?

A.—In our work it does. The first year the hen is expected to lay as many eggs as possible, and in the second year she may rest before the breeding season. That is to say, the hen is not given any encouragement to molt during the first twelve months she is laying. She is worked like a machine to get all the eggs out of her that are to be had during the twelve months, and at the end of twelve months, if she wants to moult and rest and get ready for laying by the time the natural season comes along, she can do so.

When we began to use trap nests in all of our pens I was surprised by the few hens that were really good layers. We found quite a large percentage of the hens that never laid an egg in six months. We used the trap nests from the first of March to the first of September. If the hens did not lay a reasonable number of eggs by September they were killed and sent to market.

Q.—Were they over fat old hens?

Mr. Graham: We found that the hens that had an abnormal development of fat would, in eight cases out of ten, be the poor layers. I have been asking many people what is the relation between the size of the crop and the egg production. You know it is believed among cattle men, particularly breeders of dairy cattle, that a cow must have the capacity to consume food in order to give a large quantity of milk. I believe that a hen with a large crop has a much better chance of laying a large number of eggs than a hen with a small crop. I notice that our hens that lay the best nearly all have large crops.

Last summer, in going into a man's yard in Hartford who was making a specialty of breeding the 200-egg hen, I found that many of his best layers had large crops.

Q.—How can you tell a hen with a large crop?

A.—Go to them when they are on the perch at night and feel them. If any of you have ever tried to feed birds with a cramming machine you will understand that there are some chickens that have a crop which will hold approximately twice as much as others. You will find one chicken that will hold a pound of food if you will fill its crop full, and if it is able to digest that food, it is almost sure to make good gains. You will also find others that cannot take much at a time, and they do not do nearly so well. I believe there is something in that point in selecting of layers.

I understand that in the Sussex district, in England, the chickens are fed mush or soft food from the time they are hatched, in preference to dry food, with the idea that the chickens will have a larger capacity for food. They are better chickens for fattening than others, because the crop has been exercised in the way of producing a large barrel or a large capacity for food.

A very interesting point comes up in the selection of males. I noticed last fall with the cockerels that were hatched from hens that were above the average layers that there was a marked individuality in regard to development. Some would be developed and mature when the others were quite immature. I have kept over two or three cockerels which developed or matured very early in life that are bred from good hens. I intended to breed them from a pen of mixed pullets and see whether their offspring will lay earlier than the offspring from a pen alongside which has cockerels which have developed in the ordinary way.

Q.—Do I understand that the individuality of those cockerels was at all uniform?

A.—It was uniform in some respects, but dissimilar in others. Particularly were they dissimilar in the development—that is to say, those cockerels that develop comb earliest in life are more of the Leghorn type. I have noticed that with some of the Leghorn breeders who are going in for egg production they select those that begin to grow early. I was amused by a little story Mr. Brown was telling about how the farmers in Norway selected their male birds. I understood that they would not breed from a male that was not a good crower, and that they had crowing competitions. The farmers would bring the cockerels, and they would have a crowing competition, and the male that would crow the fastest and the loudest would win the premium.

Q.—In a given time?

A.—Yes, and those fellows that would make the greatest noise are the chickens which develop the best and are the best chickens to breed from. Whether there is anything in it or not I do not know. I know that we have a few pens in which the males make a lot of noise, and we have others that are very modest and mum. Personallv, I like the ones that are not so noisy. Of course, the final test, and the only true test, is by the trap nest. For the average farmer that would be out of consideration. They are rather expensive to make, and in the next place they require much attention. I can readily understand that there are a large number of people who could devote the time to trap nesting their hens. A man who is making a specialty of breeding for egg production or for fancy purposes has to use them, because the man who uses the trap nests knows each bird individually and its performances.

Q.—You do not know which hens the good ones come from the next year?

A.—When you are selecting birds you are never sure whether you are selecting the right one or the wrong one. It may not be good policv to say that he is going to select his poor ones, but at the same time I think the most of us are inclined to the idea that the best are none too good for ourselves; if the other fellow wants to take the poorest, he is welcome to them. I cannot conceive of any practical plan or idea in which advancement can be made with any degree of certainty without the use of the trap nest. The difference from the average standpoint of most persons is that it takes time. If you cannot use trap nests, the next best thing is to select the hens as best you can by outward appearances. I would say in regard to the egg product, "try early maturity."

I have had some experience with late hatched birds which began to lay early in life, and which did well. There is another interesting point, and that is that the hens that laid the best last year are the ones that are laying the best now. In fact, we have one hen that is six years old, and she has always been a good winter layer. She lays well in the winter time, but in the summer she does not lay as well. We have kept her because she always lays in the winter. We should have discarded her for her color and shape.

but we could depend upon her eggs in the winter time. A hen that is six years old and laid eighteen eggs in the month of January one feels very doubtful about discarding.

Q.—Do you know what her pullets are like?

A.—Part of them only. What we know are very good.

Q.—Are they as good as she is?

A.—Probably a little better.

Q.—Does Prof. Gowell select his pullets for the next year's laying simply from the laying records of the mothers, or from the shape of the pullets as well?

A.—I spent three or four days with him, and, as I understand, they breed only from those hens that have good performance as pullets. Yes, I think shape and color receive some consideration, but he does not take a hen, as I understand it, that lays small eggs or white eggs. They try to select the males which were of the best type and color constitutionally equally as good. I think that Maine Station raises a higher percentage of their chickens hatched than anybody else, and I am inclined to believe that their success in that line is due to two or three reasons. One is that they seldom breed a pullet; the next is that their birds, in order to make these high records, must be constitutionally strong.

They have only those in their breeding pens that are tried, that they know can stand hard work, and the result is that when they go to breed they have got this bred right in them, and they will stand this generation after generation. I believe that their birds are all quite a different type to the ordinary man's. They are probably not any larger, but they are more rugged. They have a wonderful development of constitution. I know that I have not yet seen a hen that is a large egg producer but had a good constitution.

Breeders should put in large letters a sign with "Vigor and Constitution" on it, and put it up where they could look at it all the time, then work towards that end.

Mr. Armstrong: Do you find chickens from that hen of five years old any stronger in individual vitality?

A.—I cannot answer you, because I do not know. Our experimental work in regard to individual vitality is only just now mapped out. We have mapped out at the present time a series of experiments in individual vitality to test the method of incubation and different methods of rearing. I would say that our observation in the use of three or four-year-old males has not been very favorable. The ordinary person believes that a male that is three or four years old will probably breed stronger chickens than a cockerel, but our tests have not been satisfactory for old males.

Q.—Your experience would be in favor of the earlier matured cockerels?

A.—Yes.

Q.—And pullets?

A.—No.

Q.—What breed is Prof. Gowell using for that purpose?

A.—Barred Rocks.

Q.—Do you notice any difference in the appearance of his flocks?

A.—I have not seen the entire flock. There is one thing in the selection of early matured birds that one has to be very careful about, and that is the quality and size of the bone. There is a tendency in these birds to lack size, and you have to discard those that develop too fine bones and lack of size.

Mr. Barber, Georgetown: Did those birds get too fat because they did not lay?

A.—Yes.

Mr. **Barber**: You have to be very careful in maturing your pullets to feed flesh-forming foods until they begin to lay, and then you can feed more fat-producing foods after they start to lay.

A.—I think probably you are right there, but I am inclined to the idea that a hen has to be in good condition before she lays. What I mean by this is that a laying hen wants meat; a fat hen may lay herself lean. I do not think a lean hen will lay. When you get them in good condition and they should lay, you have to feed the entire flock for egg production. The hen that does not lay, or ceases to lay, and then becomes fat, is the one you catch not doing business.

Q.—Do the heavy laying hens have any more comb than the others?

A.—I cannot see it. I know that the heaviest laying Barred Rock hen on the place has practically no comb at all.

Q.—Is not that so with the Minorcas?

A.—I have seen some laying birds that were not heavy in comb, and I have seen hens that have had no combs that were good layers. Mr. Brown says that if you want to have a good laying hen she must be heavier behind than in the front. I know some other men who believe in lengthening the body, one man in particular, who believes that a hen to lay a lot of eggs should be long in body shape.

Q.—I think the old type of Minorcas lays better than the new American type?

A.—The present fad of getting Minorcas of excessive size—long bodies and heavy weights—has not been of very much advantage from the egg-production standpoint. I know that there are many American breeders who would criticize this, but from the information I have got from breeders, and from what letters I have, I think the old type were better layers.

Q.—In selecting females to get prolific layers, would you depart from the standard of shape very much with White Wyandottes and Barred Rocks?

A.—No.

Q.—You think you get as good layers by following the shapes?

A.—It would take a longer time, but I think you could accomplish it. The man who is breeding with but one object in view will get to the top of the ladder much easier than the man with two objects in view, such as trying to get a hen that will lay a large number of eggs and a show hen as well.

Q.—That means that there is a possibility of getting prolific layers that are not the standard shape much more readily than if you get the standard shape?

A.—It would be possible to do so.

Q.—Does the over-fat hen tend to broodiness?

A.—I cannot say.

Q.—What time of the year does that old light hen start to get broody?

A.—She will lay about twenty eggs and then goes broody. A funny thing about that hen is that she cannot hatch chickens. She has spoiled three or four settings of eggs for me. I do not think I will give her another chance.

Q.—Do pullets go broody soon?

A.—Not particularly. I think there is a great deal to be done in the selection of the males.

Q.—It is the pullets that you speak of. You like the pullet with a good constitution, to start laying in December and lay well all winter. Are they the pullets you are to look to for your good constitutioned chickens, providing you are breeding from them?

A.—I do not know, but I would as soon take chances on those as the others, although there are people who have the opposite view. We hope to be able to tell you more when we get next season's results.

Q.—At present you think it is the constitution? If a pullet with a good constitution lays well all winter, should we look to her for good chickens?

A.—I would rather have her in the second year. I would give her a chance to build up. I think we should, if possible, use one set of hens for breeding purposes and one set of hens for laying purposes, but the practical side of that is the expense. Of course, if what results we are getting now are true, if it is true all the way round that the hens that lay this winter lays well next winter, how am I going to breed from her and not stop her egg production? If I breed from her and she lays well in December and January, I am in the same predicament with that hen as I was when she was a pullet. If I do not want her to lay, and stop egg production, I may be doing her more harm than good.

Q.—Has she not more constitution to stand the laying the second year than she had the first?

A.—We have one hen that during her first year laid a large number of eggs, and they nearly all hatched, and they are nearly all hatching again this year. I do not know how good they are, but we are getting chickens out of them, and got chickens out of them all last summer. She is one of those unfortunate hens that is not very good in type.

On the subject of the housing of layers, much may be said. The majority of us are inclined to cheap houses, what may be termed "fresh air houses." You can build a house expensively and ventilate it, and you can probably get an abundance of fresh air, but you would be throwing away your money unless you use artificial heat. If you were to ventilate the house freely you would feel that the temperature would go down unless you heat the air as it comes in, which would be expensive. My personal experience would be in favor of the cool house extra well ventilated that is dry and is free from draughts in the roosting compartments.

Q.—What do you call a cool house?

A.—I would not care if the temperature went down to 10 or 12 degrees below zero inside the house in very cold weather. I have found that some birds freeze much easier than others; for instance a bird that gets the least out of condition will freeze its comb when the thermometer drops. Take the chicken from the warm house and put it into a cool house and it will freeze, and the chicken that is in a damp house will freeze at 10 degrees above zero, while one that is used to a dry house will stand 30 to 40 degrees of frost. One cannot tell at what temperature a chicken will freeze. I have seen some Leghorns stand the winter better than some Plymouth Rocks, and some Plymouth Rocks stand it better than some Leghorns; it all depends upon the individual bird. A story that Prof. Gowell told me in connection with the Institute meeting was to the effect that a farmer at the Institute meeting had him go over to his place to see a house that was the opposite type—a warm house. He said the farmer was extremely careful that he should go in quickly. They both tumbled inside the door as quickly as possible. He had hens in there at about 2½ square feet per hen, and it was warm and damp, but they were laying well. They had a "washed out" appearance, but he was getting eggs, and the conundrum was, Why he did it? His conclusion was this, that the caretaker kept them boxed up in a fairly uniform temperature, and they knew no other condition. That the eggs were probably no use for hatching, and in the spring the hen would be no use, but it was a demonstration to show that the trick could be done in a warm, damp house. His theory was this, that had the men been careless in shutting the doors in going in and out of the hen house he would not have succeeded as well.

It is not so very far back when we believed in warm houses, with two or three thicknesses of tar paper in the wall. Take, for example, the experiment that was conducted at Connecticut Experimental Station, where they took nine houses, representing the same breeds and the same type of house. In the one house they gave the hens warm water, in the next cold water, and in the last they gave them snow. The hens that drank the cold water laid the most eggs; and when there was snow the hens that eat the snow laid better, and when there was no snow their egg production fell off somewhat; the ones that took the warm water laid the least. It is not very long ago that we were told that we must not let the hens out in the snow. Now they come around and tell us to put snow into them. That is simply another illustration how we jump from one extreme to another. It will undoubtedly take more food where you give them snow. I have been interested in the experiment as to whether it takes more food to produce one dozen eggs in a warm house than in a cold house. The coldest temperature we had in a house is 7 degrees below zero. On the same day the warm house was 14 to 18 above zero; that would make a difference of about 20 degrees in temperature. We have not been able so far to find out as to whether it took more food to produce one dozen eggs in the cold house than in the warm house, because the hens have invariablv laid more eggs in the cold house than in the warm house. You cannot get any ratio by which you can figure as to the cost. The hens do not lay the same number of eggs individually. Prof. Gowell has a heated house, and has been able to get more definite results. He is of the opinion that it takes more feed to produce a dozen eggs in a cold house, but not sufficient to pay for the coal. We find hens laying extremely well in very cold weather. I have correspondence from a man living back of North Bay, in what may be called a cold district, and there the hens have done very well, probably better than the average hen does. My idea of house construction is simply what was stated in the start. First, to get the dry house, in which there is no hen odor, and free, if possible, from drafts.

I want to draw your attention to two or three things in connection with the curtain-front house. Where the hens are running in large flocks one requires to be careful in opening the curtain screens. If you open one on one end of the pen and another on the opposite end, a draft is usually the result. You can put up two windows side by side at either end, but on a windy day do not put up one at the east and one at the went end at the same time. Where there is more than one curtain in a house, put them all up on a bright, sunshiny day, but on a cold day open one and let the others down; that is one of the points you have to watch very closely with the housing of hens. The straw loft has some advantages and some disadvantages, but so far as I have seen I do not know of any kind of ceiling that is equal to the straw loft. It keeps the house dry in winter and helps to cool it in the summer. We have two houses with prepared roofing on, and two with an ordinary "V"-shaped roof, with straw lofts. There is a difference of 10 degrees in the summer in favor of the straw loft houses.

Q.—What are the advantages of a straw roof?

A.—The advantages of the straw roof is that it keeps the house dry.

Q.—What are its disadvantages?

A.—Its disadvantages are that the straw needs renewing annually, and it collects the dust.

Q.—How often have you to renew it

A.—We have not renewed ours; you should renew it every season. The reason we have not renewed the straw in our houses is that we wished to know if the straw would become infested with vermin. You need to build the lofts high enough so that your head does not touch the straw and get the dust. I think you should build the house at least seven feet high at the eaves.

Q.—You might tell us about that long house?

A.—I regret to say that the long house has been somewhat of a disappointment to us, in that the stock is not what we wanted. When we came to fill the long house we did not have enough chickens to put in, and I bought twenty-five pullets which had been exposed to contagious diseases. This was unknown to me at the time, but I have found out since. When the birds came in thev looked perfectly healthy, but after they were here two weeks I noticed some developing chickenpox, and we have had a battle royal with two pens for some time. There are some individual hens in the pens that laid probably eighteen eggs a month, but there are some that have not laid any eggs. They lay for a time and then they get a touch of a disease and stop. The large pen has not laid any more eggs than the small pen has. We have not as yet had these birds in prime condition. The working of the house has been very satisfactory. We were trying to test them in flocks from 60, 90, and 120. There has been no difficulty of overcrowding on the roosts. With this house one has to be careful of the manipulation of the windows, especially the long pen, which is forty-five feet long.

The feeding of the hens I do not believe is as difficult a problem as the housing and selection. The hen that is bred right will lay right if you give her the chance. The hen that is bred wrong and is fed well often will not lay. I bought twenty-five hens and pullets from a man who does not make a specialty of breeding them for egg production. These twenty-five birds have not laid a solitary egg from the 1st of October to to-day, and the hens running with them, of another strain, have been laying fairly well. They run along in the same pen and eat the same food. This indicates to me that there is something in breeding. I also noticed that in a good many pens the daughters of the egg-laying hens are doing well this year, so that I would ask you to pay more attention to the selecting and housing than the feeding. Of course, good birds poorly fed are not very good, but poor birds well fed are not very satisfactory. I might give you an illustration of the condition that is now present in one of the Eastern States. There are two men who have practically the same strain of hens; the one man raised his in flocks, and the other one raised his separately, and both are breeding from the same individual hens. The one man is getting an average egg yield of fifteen or twenty eggs per hen each month; the other man is getting none.

Q.—Were the eggs naturally hatched?

A.—Yes, and now they are both feeding about the same and housing about the same. As near as I can tell in looking at the flocks, I have come to the conclusion that the one man was not feeding enough; he was afraid to feed his hens too much; in addition to that, he is a nervous man, and the hens are afraid of him. When he goes into the pen the hens run all over. The other man is a good feeder, and will sit right down and talk to the hens, and the hens are laying well.

Q.—What was the breed?

A.—White Plymouth Rocks. I believe the difference is largely in the man. We can see a great difference in our short-course men. Some of them do lots of things that are all right, but occassionally one does things that are all wrong. Some have the happy faculty of forgetting—forgetting to shut the doors and to feed the chickens beef scrap. These are little things, but they all count in the end. In the feeding of laying hens there are three things that you have to bear in mind—you have to feed them vegetables, meat, and grain. Layers need exercise in order to keep them healthy.

Q.—How do you exercise them?

A.—Just bury the straw in the wheat, or the wheat in the straw, which ever you like. I have seen eggs produced from all kinds of grain. One man naturally favors wheat, but probably another man favors corn. A great many dislike corn and say that it is a bad feed. Corn is undoubtedly good if fed properly. If you give a hen a chance she will balance her own ration, but in the feeding of meat we are meeting a very difficult problem. The price of beef scrap has gone up 25 cents a hundred in the last year, simply because of the demand, and as the demand increases you may expect Armour and Smith to increase the price of beef scrap. There does not seem to be any other food that takes its place. I prefer green cut bone when I can get it fresh cut to-day and feed it to-morrow. In the summer it is bad before you get it, and it is worse when you begin to cut it, and when you come to feed it you ought to bury it. In the winter time if you get it frozen hard it will be all right. I do not think there is any material that will produce eggs better than green cut bone. The next best thing is to use butchers' refuse, and when you get past that you come down to beef scrap, and the great advantage with beef scrap is that it is always convenient and always ready, and it saves time. Of course beef scrap is much more concentrated than is green cut bone. Now, if the manufacturers of beef scrap inform me correctly, we are buying beef scrap at $3 a hundred, just as cheap as we buy the beef heads at 10 cents apiece, weight for weight. It takes three pounds or more of meat to make a pound of beef scrap. I do not know if that is a fact or not, but that is what some of them have informed me.

Q.—What about skim milk?

A.—Skim milk is all right in the summer. In the winter a hen, in order to get sufficient nutriment, would have to drink a large quantity of it. You can get skim milk and put it into curds, and have excellent food. In a great many districts skim milk is out of the question. I do not know anything about the condition of condensed milk and milk albumem. The experience of most people who have used it has not been favorable. Probably some of you have used it with good results.

Mr. Graham: There are some Canadian butter-makers who are trying to make a powder from the buttermilk. There are two or three people working at it trying to produce a powdered buttermilk. You who like buttermilk to drink should get it. In connection with the vegetables, if we can get plenty of mangolds and clover hay we are pretty well fixed. I do not know of any station that has tested the value of mangolds and clover hay except Maine, and Prof. Gowell has told me that he can get as many eggs from hay as he can from mangolds. I do not understand that; they are not the same foods. I would like to see the two together myself. We encounter difficulty in getting clover hay. I have been trying to buy clover hay, and I cannot get it. When I find a farmer who has it he will not sell it.

Q.—Is it hard to feed mangels after they are frozen?

A.—They are then inclined to cause looseness of the bowels when we feed to young chickens.

Q.—How do you feed them in the cold house?

A.—Just put a mangel on a nail and let them eat it up.

Mr. Krouse: They are frozen soon after you hang them up. At my place they freeze before the chickens get to them.

A.—Yes, they freeze sometimes, but those mangels you have are so big one would feed a cow.

Mr. Krouse: I cut them in three pieces; they weigh forty-five pounds.

A Member: I feed pulped mangels—just what they will pick at and eat in half an hour.

A Member: Do you get good results from feeding alfalfa?

A.—Yes, especially alfalfa leaves. The experience of practical men has not been altogether favorable to alfalfa meal, owing largely to the manufacturers using in some instances poor hay. The New England men, in the vicinity of Long Island, are divided as to the value of alfalfa. Some of the duck growers, who use a large quantity of green food, have given it up entirely. They have gone back to the ocean to get the green food, and it works more satisfactory; but here I do not think we can get much better foods than alfalfa meal and mangels, and if we cannot get them we can grow them.

Q.—How does alfalfa compare with red clover?

A.—It is of a higher feeding value.

Q.—Is lucerne clover as good as alfalfa clover?

A.—It is the same plant.

Q.—Isn't it better if you take that alfalfa and cut it and then grind the whole thing up?

A.—Have you any idea what it costs to grind?

A Member: Yes, but it is a good thing for the market.

A Member: I have never seen the results of the chemical analysis of it, but would it be good feed?

A.—It would not be as good feed as the leaves alone. There is an action from the fibre that might be worse, but I understand in feeding animals you always have a certain amount of fibre present. The stomach gets a better chance to work on the foods when a certain amount of fibre is present. We have an alfalfa expert here, Mr. Elford, from St. Anne, who has grown alfalfa for years. He will tell us if he ever had any trouble with it from woodiness.

Mr. Elford: No, I like to feed it as it comes out of the barn, and I do not know of anything better to feed if it is well cured. I see where men are paying $22 a ton for clover hay, and using it for litter. They simply throw in a fork-full of clover hay from day to day, and the hens eat the leaves and the rest goes for litter.

A Member: What is the right time to cut that alfalfa?

A.—When it is in good bloom.

Mr. Elford: When it is about one-third in bloom.

Q.—Would the clover hay be better if it was cut up?

Mr. Graham: I do not think it would improve it much.

Mr. Baldwin: I am sure we have all enjoyed very much Mr. Graham's remarks. I had one or two things to say to you, but I do not think I will take up your time now. Mr. Graham has put in my hand a letter from Mr. F. H. Pope, of Toronto, which I will read:

"Dear Sir,—As the annual meeting of the Poultry Association again draws near, I thought my recent experience might be useful to the advocates of cold houses and dry feed. After studying the poultry bulletins issued by the Ottawa Experimental Farm and Guelph Agricultural College, and especially the first annual report of the Poultry Institute, I decided to keep poultry, and to keep them on the cold house, dry feed plan, as laid down by Mr. Hunter.

"Last August I built a house 12x13 feet, with shed roof 6 feet and 9 feet high, with the front facing south, made of glass, except the space for the door. The material used was rough lumber only, with tar paper battened on the outside and inside, and is so cold at times that a few nights ago my Leghorn rooster froze his wattles very badly.

"About the end of August I purchased from a gentleman ten Leghorns, one and two years old; from a farmer sixteen Barred Rocks, four months old, and from another farmer twenty-four Barred Rocks, three months old. The sixteen Barred Rocks turned out slightly crossed, but made good growth, and on the 9th December the birds started to lay.

"Their run was nine feet by forty feet, and they are never let out. My flock consisted of nine hens, one rooster, six cockerels, and thirty-four pullets. The feed was: Morning, cabbage leaves (now mangel wurzels), and a pail of dry bran and corn meal, three parts bran and one corn meal, dry, and also any scraps from the house, dry and cold, raw or cooked, just as they came. Dinner, two quarts of oats. Supper, three quarts of cracked corn wheat and barley, mixed. A hopper of beef scraps was always hanging in the house; also one of grit, oyster shell, and granulated bone. The water fountain is filled twice daily.

"When I killed the cockerels at Christmas they were as large as hen turkeys, and nice and plump.

"I clean the dropping board daily, and feed all the grain in the litter, on the sand floor.

"I have not had a sick bird, and my egg yield is as follows: December 9th, 1906, to February 1st, 1907, 896. My January egg yield for each day was as follows: 14, 16, 18, 14, 17, 19, 15, 23, 15, 20, 22, 20, 22, 19, 21, 21, 21, 18, 26, 22, 23, 26, 25, 24, 27, 22, 28, 22, 20, 24, 30.

"My reason for writing is to thank the Association for the assistance their literature gave me, and because no one seemed certain as to the success of dry feeding on a small city lot, where the birds are always confined. My neighbors, who feed hot mash, have not had half the eggs this winter that I have. I am an amateur, and do not profess to know much about poultry, but am good at details.

"Yours very sincerely,
"F. H. Pope."

Mr. Baldwin: I would just like to add one or two things. Mr. Graham has spoken of the fact that some birds would freeze more readily than others. I had an experience of that on my return home after being with you for a couple of days during the short course. The night I arrived home it was very cold, and it was late when I got there. I was not up to the farm that night, but when I went up the next morning it was something like 14 degrees below zero. There were two cockerels in a coop by themselves. One of these cockerels was quite badly frozen and the other was not touched. Now, that is just an example of what Mr. Graham was saying—that one bird in a healthy condition will resist the frost and will not show any frost-bites, whereas another bird that is not in a good condition will readily freeze. The other point is that Mr. Graham has had a great deal of experience with curtain-front hen houses. My house has only windows, and those windows fit loosely. I want to say that this winter I have had no frost in this house at all—I mean frost collected on the walls. There has been no dampness at all, and the straw has kept wonderfully dry and fresh. I have just a little bit of doubt as to whether those curtained windows do as good work as they are supposed to do. I had a little experience a few years ago with hens that laid well one year. Those birds laid exceptionally well. The next year I bred almost entirely from those pullets, getting strong, vigorous offspring, and I bred from those the following year, and my record for eggs went down. This emphasizes this point, that pullets, especially when they are pullets, and they lay constantly all winter, perhaps to some extent sap their vitality or their ability to give vitality to their eggs to hatch that year. They are very much like an orchard. If an orchard over-bears one year, the next year nature re-asserts itself, and you have no heavy crop; so that there is the advantage that, while you push the pullets from year to year, you get all the eggs out of them, and the second year they make better breeding stock; but, if you breed from pullets continuously, because they are the egg layers, you are apt to lower the egg record of your flock. It seems to me to be a fact from the practical experience I have had.

EXPERIMENTAL WORK IN WEST VIRGINIA.

By W. A. Brown, Guelph.

I feel that I must offer some apology for taking up your valuable time this afternoon, but, since Mr. Graham has asked me to say something about my work at the West Virginia Experimental Station, I will do so.

About the 5th of May, last spring, I went down to Virginia, and I had a very pleasant trip on the way. When I arrived there I was very much taken with the country. It is certainly a beautiful spot. The Alleghany Mountains reach right down through the State. Morgantown, where I was going, lies about three miles from the foot of the mountains, so that the Experimental Station is located right among the hills. There is very little agricultural development in the northern portion of the State. The mineral resources form the main industry in that section. The hillsides are literally clothed with undergrowth, blackberry bushes, sumachs, and other low-growing shrubs. The rivers are few in number. Streams running through deep valleys flow down to them. I expected to see a lot of colored people there, but in the mountains of Virginia the negroes are very scarce. They seem to have no inclination for mining, glass-blowing, or metal-working.

The climate was very pleasant in the early part of the summer, but in August and September it grew very hot—too hot almost to work. In the winter, from what I heard from others, I do not think it would be so pleasant. It is neither far enough south to get perpetual summer, nor yet far enough north to get perpetual winter.

The Experimental Station farm is situated about a mile from the city of Morgantown, on the top of the flattest hill in the neighborhood, so far as I could see. There was an excellent view from the farm looking down towards the Monogehela River in one direction, and in the opposite direction looking towards the city. All around there were numerous mining villages.

Agriculture is not carried on to any great extent. It is chiefly confined to dairy cows, Angora goats, and chickens. To my mind, West Virginia is well adapted to the raising of chickens. There is an almost unlimited market. Although it has not developed among the people as yet, I believe that West Virginia will in time compare very favorably with the New England States, so far as the poultry industry is concerned.

As to the Experimental Station proper, they grow a very small quantity of grain. Corn, potatoes, and small crops of hay form their chief experimental work, besides dairying and poultry. The poultry experiments at the Experimental Farm require the most bulletins. Here is a diagram of the poultry plant.

White Leghorns were the only breed of fowls kept on the plant. The main poultry house is constructed on the Maine State plan, with very slight variations. It has a slanting roof, covered with tar paper. The front, you will see, is much similar to the Maine State house. It is a curtain-front house, with a slanting roof, much similar to Mr. Graham's fourth experimental house. It is constructed of tongued and grooved lumber, double boarded on all partitions to give it strength; there are seven rooms in the house, with a feed room in the centre.

The house was built on a cement foundation, there was a gentle slope in one direction, and a tile drain placed below the foundation on the froot side gave excellent drainage. It gets very windy at times in that section, and it requires a house strongly built to stand the force of wind. All these experimental houses were staked down with heavy oak staves, to prevent the houses from being overturned.

Q.—How were they staked down?

A.—A stake in each corner.

Q.—Fastened with ropes?

A.—Nailed. Apparently stakes had been driven in and then pieces nailed on the corner of the house and stakes nailed to them. The main house had a cement floor. The ground had been levelled off, and about half an inch of cement flooring was used in each pen. It made it very easy in that way to turn over the litter.

Q.—Do we understand from that that he just levelled off the top earth and dumped down half an inch of cement?

A.—Yes.

Q.—Did he smooth it off with a trowel?

A.—Smoothed it off with a trowel.

Q.—Was it rough or smooth?

A.—Rough. There were about sixteen or twenty nests beneath the droppings board in each room. There was one feature about these nests which struck me very forcibly. The eggs were collected from the nests after driving the broody hens out, then a little door was closed, and the broody hens shut off from the nest for the night. In that way the professor thought that the lice were largely held in check. He believes that the broody hens furnish a most excellent place for lice.

D.—Did you get very many broody hens from those Leghorns?

A.—Seven or eight hundred.

Q.—How did you keep them in check?

A.—Beneath one of the dropping boards a pen was fenced off, and we shoved them in there.

Q.—Right on the ground?

A.—Yes. The perches would be about 4½ feet from the ground.

Q.—And beneath that you had your broody coop?

A.—Yes.

Q.—Were the hens inclined to lay under the nests, in the litter?

A.—In one pen we changed a flock of birds. There were about 100 in an old building, and they were moved into this room. In the first or second day's laying I would get from twenty to thirty eggs beneath the nests, and the litter was changed perhaps twice before the birds would lay in the right place.

Q.—Do I understand that you use the litter as freely in the summer as in the winter?

A.—Yes.

Q.—And you can make the hens work just the same?

A.—Yes, I tried to feed them in the barn-yard, but they got over-fat in a short time, and we had to make them work.

Q.—Was it a large, free range?

A.—Yes. There were about 500 of them in this house on free range.

Q.—Was there any difficulty of them not going to their right pens, or did they divide up pretty evenly?

A.—One pen was rather boycotted. I have counted about 100 in one pen and perhaps forty or fifty in another.

Q.—What would you do there then—leave them for the night?

A.—Yes. I omitted to mention that in the summer time there were summer roosts placed close to the wire netting in the front of each room, so that a large number of birds went there.

Mr. **Graham**: What did that house cost?

A.—I cannot say; but lumber is not dear there.

Q.—How many acres of land had you in that run?

A.—A thirty-acre field extended back from the house; the land was not much good for agricultural purposes, not having been very heavily fertilized, but the birds wended their way down towards the pasture fields and into a large field of green food that was grown for dairy cows.

Mr. **Graham**: I understand these buildings face the south?

A.—South-west.

Mr. **Graham**: How hot is it in the summer time?

A.—The hottest days were from 90 to 100 in the shade. That was one difficulty that might have been remedied; the birds had little or no shade. There was this green crop back of the barn, in which they stayed much of the time. In the early morning it was not quite so hot, and then they scratched for the grain.

Mr. **Graham**: Did you set eggs from these layers?

A.—Yes, the eggs laid were used largely to produce the chickens.

Mr. **Graham**: Did you keep breeding stock in the colony house?

A.—No.

Q.—How did the fertility of the eggs from the hens on the free range compare with that of those confined?

A.—The eggs from those on the free range were a little better.

Q.—How would the fertility run?

A.—From 66 to perhaps a little better than 80 per cent. of all the eggs set. You might say that the average of all hatches last summer were 70 per cent. of all eggs set. It was remarkable the number of chickens taken from those incubators. In regard to the feeding of the birds, they were hopper-fed mash and beef scrap. There were central posts in each room to support the roof, and a hopper was nailed to each of these; a little platform stood out, so that the birds could jump up and eat from their hopper. They received mixed corn, wheat, and oats, equal parts by weight, in the morning and evening, in their litter, and had free access to beef scrap and mash in the hopper throughout the day. The mash was composed of equal parts of bran, oat chop, and corn meal. For a time we had some trouble. It was difficult to get corn meal that would work in the hopper. Little particles of corn would come down to the mouth of the hopper and the hens would pick that over. They got into the habit of scooping the meal out, and in that way a considerable was lost. The professor thought it would be well to change the method of feeding for a while, so we stopped using the hopper and started feeding wet mash at night, with the same proportion of grain and the beef scrap as had been used before. The result was that the egg production fell for a time. Then it picked up till it was almost equal to what it had been before. We got some better meal and tried the hopper again. The result with the hopper feeding again was similar to the wet mash; the egg yield dropped with the change, and they never regained their uniform egg production again. This was due largely to the advancing season, for it was then drawing towards the latter part of August or the first of September. We concluded, however, that the hopper feeding was the most satisfactory; it was a great saving of labor, but the professor said that there had been a much heavier death rate than before, due to the concentrated form of the mash.

Q.—You had some experience with feeding rye?

A.—Yes, the only grain grown at the station was rye. It was fed once a day, with wheat and corn, and some of the pullets that were maturing rather too quickly were fed on rye alone.

Q.—Did your egg production go down with feeding rye?

A.—It did.

Q.—What was the size of the house?

A.—The house was 160 feet long, 14 feet wide, and the pens were 20 by 14 feet.

Q.—How many in each pen?

A.—It had been built for sixty birds to a pen.

Q.—How long were the roosts,

A.—The whole length of the house.

Q.—Single roosts?

A.—Two roosts. As regards lice, you would think that in that warm climate they would breed very fast. It is true they did, but they were held in check. We shut up all the broody hens, and every two weeks, or sometimes every ten days, the roosts were painted with ten of crude petroleum to one of the disinfectant. With repeated applications it was possible to keep the lice in check. In some of the new colony houses the lice did break out, but perhaps three applications of the preceding eradicated them.

Q.—Didn't that discolor the plumage of the birds?

A.—Yes, it did.

Q.—What kind of lice?

A.—Sparrow lice—bird lice. We got them under the perches in the day time.

There is one objection to the use of curtains in the Maine State house—the Leghorns will invariably roost on them. They would fly up there, and you would find perhaps a dozen sitting on the higher curtains in a room. This created considerable dirt on the curtains, and, to my mind, would soon destroy their usefulness. I do not think they would resume their original value for conducting fresh air. I may say that a new building was put up 180 feet long with pens 16 feet wide. It was built of oak lumber, two thicknesses on the back and two thicknesses on the ends. It has a pitch roof, but this roof is not satisfactory, as it is too hot. The heat of the sun comes through the tarred felt with great force, and in the hot weather the hens cannot scratch about noon time. In this house there is to be a commercial experiment. About 600 or 700 hens were placed in it, and all the eggs and the feed consumed are kept track of. The birds have a free range, and they are strong and vigorous and in prime condition.

Mr. Baldwin: Have you trouble with the males fighting?

A.—No. There were twenty males, perhaps, in the main house. Some were taken away and put back again. Then there was a high old time; but when they are together from the time they are cockerels they are all right.

In regard to the experiments. We had nine experiment houses, and from these is derived the experimental work for which the West Virginia Experimental Station is noted. Prof. Atwood has carried on experiments, and has written several bulletins on them. The houses are numbered 1, 2, 3, 4, 5, 6, 7, 8, 9. Two yards at the back of each house are each 100 feet long and 15 feet wide. The house itself is 10 feet by 20 feet, and twenty birds are kept therein. Rye was sown in one run in the fall, while the birds were in the other. When this had grown up in the spring they were turned on to it, and oats were sown in the bare run. After the rye was eaten off, the birds had the range of both runs.

Q.—Is it plowed up?

A.—Yes.

There were trees scattered through the runs, giving plenty of shade. We used a very ingenious cultivator, although the runs were only fifteen feet wide. It was a neat little arrangement, and did not weigh more than forty or fifty pounds at the most. The cultivator was light, but it would cut the soil up to the depth of 1½ inches to 2 inches.

Mr. Graham: Are the teeth like those we have on a spring tooth cultivator?

A.—Yes; about the same.

Mr. Baldwin: Did they stand out as wide as the whiffletree?

A.—Not as wide; perhaps it would take seven or eight turns up and down the yard to complete it.

Q.—Is it an American invention?

A.—Yes. It is the best thing I had ever seen for cultivating the soil. One can turn all the soil in the run much quicker than by spading, and it is not so clumsy as our ordinary garden cultivator.

Q.—Will it work clay soil?

A.—Yes. It has a sort of scooping arrangement. There were some very important experiments carried on at the station last year, a number of them being a comparison between the hopper feed and the old method of feeding. The first house was rather an experiment by itself, and the birds were fed once a month. Corn is much cheaper in that section, and this experiment was to see if the fattening tendency of corn could be overcome by a nitrogenous ration.

The birds had bran and the beef scrap before them continously, but the experiment did not result very satisfactorily. The fattening feature of the corn was not counteracted by the nitrogenous food fed from the hopper. There were twenty birds in each house, and they were weighed from time to time. The birds in the first house were fatter than those in the other houses. This experiment was carried on all year, and the birds laid better in the summer than in the winter.

Q.—As to feed, were they fatter in the summer than in the winter?

A.—I could not say about that; they gained up rapidly in fat. They were put in there in November as pullets, and fed from the hopper from the first. They rapidly gained in weight. The second house was also used for an experiment with hopper feeding. There was a hopper set in this house in which was a mash of equal parts by weight of oat-chop, bran, and corn meal, corn, and beef scrap. The hens had access to the grain part of the hopper at night only. The grain compartment was opened when the eggs were collected at night, and shut in the morning when the birds were fed. The next house had a similar hopper, and in it was a mash of similar composition to the last pen, with the exception that they had a mixed ration of grain—corn, wheat, and oats—in equal proportion by weight. House four was fed by the old method. In this house was a closed feed-box, divided into two compartments, the one for mash and the other for grain. Quite a large amount was put in at one time—about sixty pounds of grain and eighty pounds of mash. The birds were fed the mixed grain in the morning and the mash at night.

Q.—What is the difference between a bin and a hopper?

A.—A bin was just a closed box, nailed to the wall. It was just a place to keep grain. It was found more satisfactory to take down a large quantity of perhaps sixty pounds and place it in a house than to keep track of the 1¾ pounds or so which the hens would eat at each meal. Much more accurate results were obtained in this way. House 9 was entered into the same experiment with houses 2, 3, and 4. It had a hopper with mash and beef scrap in it, and a bin of mixed grain. They were fed mixed grain night and morning, and had access to the mash and beef scrap at all times. In regard to the hopper feeding experiment, as compared to the old method, the birds in house 9, that had the mash before them all the time and mixed grain morning and night, gave the best results. No pullets died in that house, and their egg production was considerably greater than that of the other pens. This is the method we used to find out how much they would eat: The litter was eight or ten inches deep, and in the morning I would take a pint measure and scatter the grain in the litter. Perhaps once or twice a week I would go back in the afternoon and turn over that litter, and if I found there were any kernels of corn in it, I knew they were getting too much; if there was some wheat left, they were still getting too much; but if there were only a few grains of oats left, they were getting about right. I found that a little handful more or less of this grain would cause the egg yield to drop two or three. That was the way of determining whether they were getting the correct amount of feed, and the way of getting at it was by examining the litter for the amount of food left. This house gave better results than did house three, where they had mixed grain in the hopper. House 4, the one fed in the old way, laid well in the winter, but their total egg production was not equal to that of house 9. House 9 outdid them all in egg production. House 4, fed by the old method, gave better results than did house 3, which had the grain in the hopper. Houses 1, 2, 3 had the grain in the hopper, and none of them laid well in the winter.

Houses 5 and 6 were each a pen of two-year-old mongrels, secured from farmers in the neighborhood. It was an experiment to ascertain if the pure-bred fowl laid as well as the mongrels. The result was that both in their first year and in their second year the pure-bred fowl far outdid the mongrels; the mongrels got fat and would not lay. They were fed on the wet mash at night and the grain in the morning.

Mr. Graham: What is the sum and substance of your opinion for feeding White Leghorns?

A.—The method employed in house 9 with the mash and beef scrap in the hopper, and the mixed grain night and morning in the litter, gave the best results.

Q.—Was there any difference in the fertility of the eggs used in those houses.

A.—The house fed on the corn did not give as good fertility as the others, but of those fed with mixed grain, hopper fed or fed in the old way, little or no difference was noted.

Q.—Was there any preparation made for green food in winter?

A.—Yes, clover hay was substituted, but no mangolds were used; just a litter of clover hay.

Mr. Graham: Where did you get that hay?

A.—From the experimental plots.

Mr. Graham: How often did you change the litter in the house in the summer time? Once in two months?

A.—Once in a month and a half.

Mr. Graham: Did the experimental houses have cement floors?

A.—Yes; there had been rats previous to the putting in of floors, but they left soon after their holes were blocked up.

Mr. Graham: Where did they go to?

A.—I cannot say.

Q.—The rats did not bother the hopper at all?

A.—No; the hoppers were set right out on the cement floors. Snakes were the worst pests we had.

Q.—On a cold day, provided it was not stormy, did you open the windows to let the sun in?

A.—Yes; but if it was damp outside, raining and blowing in, the curtains were closed so as not to allow the litter to become wet. The wind gets a great sweep for perhaps ten miles, and when the rain was coming in, it would wet near half the house.

Q.—You built those houses and staked them to the ground, so that the wind would not upset them?

A.—The wind and thunder storms were the most difficult problems we had to contend with.

Q.—Were there many snakes?

A.—A large number. I used to carry a gun with me, but I did not succeed in shooting any.

Mr. Tebbs: In regard to snakes, since I built a poultry house I have had them burrowing up through the floor of the chicken house and coming up like rats.

Q.—That mash in the hopper was ground grain?

A.—It was equal parts by weight of corn meal, oat chop, and bran.

Q.—Did you mix the meal in among the scrap?

A.—No; the beef scrap was in a different compartment altogether.

D.—Did you hatch by the hen or the incubator?

A.—Wholly by the incubator; they dare not use hens. The snakes do not create any trouble, but there were plenty of two legged snakes, and we had to keep everything under lock and key.

Q.—What would you use as a substitute for bran? It is said that a great deal of bran is not pure; it is adulterated.

A.—We do not attempt to substitute anything.

Q.—Was the mash wet?

A.—No; not in the hopper feed houses. In several houses there was an experiment, some hens fed on wet mash and some fed on dry mash, and the birds fed on dry mash gave the best results.

Q.—Did any of your chicken houses have trap nests?

A.—No. House 9, however, would have made an exceptional record if they had been trap-nested. Eighteen was the highest day's yield in the spring, and in the summer it averaged from twelve to sixteen from twenty hens.

Q—What make of incubator did they use?

A.—Cyphers' machines were used, with temperature 102½ to 103 degrees.

Q.—Hanging thermometer or the temperature on the egg?

A.—Hanging thermometer.

Q.—Did you leave any of the doors open in the incubator?

A.—The doors were gradually opened during the process of incubation in the hot weather. We have had them open over an inch, and even then would secure an 80 per cent. hatch of all the eggs set. They came out of the shell all right, but we rarely raised over two-thirds of what was hatched. We had several large machines, three or four with a 360 egg capacity.

Q.—Did the chickens have the white diarrhoea?

A.—Yes, we had a few instances of it, but non-absorption of the yolk was more prevalent. We found chickens ten days to two weeks of age where the yolk had become a hardened mass. The blood vessels were quite apparent, and inflammation had set in in the organs in close proximity to the yolk. The greatest mortality among the chickens was due to inflammation of the lungs. Just what caused it we were not able to solve. The great proportion of the chickens that died were cut open and examined.

Q.—Was there any chickenpox?

A.—No, there was no such disease. The greatest cause of death among the hens was due to indigestion, brought about by the dry mash in the hopper feeding, and that in not very large proportions. There was not anything like the percentage of deaths that one might expect.

Q.—Was grit and oyster shells used?

A.—Yes. A hopper was made in the partition, about fifteen inches from the floor. There was just a piece cut out of the partition, and a flat board shoved right through. Higher up there was a door, and we would open up the door and dump in equal parts grit and oyster shell—dump them both in together into the hopper in the partition in the wall.

Q.—When you speak about opening the door of the incubator during the time the chickens are hatching, what temperature would the room be at that time?

A.—I cannot say; it was the summer time. It had been done previous to the first of May.

Mr. Baldwin: How is the room heated?

A.—The incubator cellar was not heated at all. The furnace room was hot water heated, and it was divided by a board partition from the incubator cellar, but no special precaution was taken to heat the incubator cellar.

Mr. Baldwin: Were there any hot water pipes in the cellar room?

A.—No. The incubator cellar was situated about four feet below the surface of the ground. There were twelve windows in the cellar, and the only ventilation was by two opposite windows, and I might say that in all the time I was there I never noticed that peculiar incubator smell. There was no special precaution taken, except to open these windows; but even while they were closed during a thunder storm the incubator odor was never noticed.

Q.—Did you use coal oil or gas?

A.—Coal oil.

Q.—What precautions did they take when filling the lamps?

A.—They were filled in the same room. The lamps were removed from the incubator, and the coal oil can stood in one corner.

Mr. Baldwin: You could not notice any odor in that room?

A.—No. They ran seven or eight incubators. Above the cellar was the brooder house, with a capacity of seven to nine hundred chickens. They are kept there for two weeks, then are removed to the small colony house back from the buildings. As soon as another hatch would come off they would be put in the brooder house, the older bunch having been removed to the colony houses. The best cockerels were separated and allowed to grow and mature by themselves, and the rest were killed and sold as broilers. The more mature pullets, after leaving the colony houses, were taken out on the free range. We built quite a few of those tent-shaped colony houses, with the wire window in the back and a screen door in the front. The larger pullets were placed in these, so as to prevent their laying too early. They were placed in the colony houses. There was a forty or fifty-acre pasture field on the side hill, and there they were left for the summer. They were fed only once a day, and subsisted on grasshoppers and bugs. In that way we secured some of the most hardy and most rugged pullets I think that I have ever seen. Their condition was well brought out in what Prof. Graham was saying in regard to pullets. They were lively and vigorous, they showed good constitution, and were the birds one might expect eggs from, whether they were trap-nested or not. The majority of the cockerels were sold alive. Down there the demand was so great for chickens that they would take them in most any form. Everything is shipped into that country from Kentucky, New York, and Ohio, so that poultry products in any form are easily sold.

Q.—What price?

A.—The broilers ranged from 30 to 40 cents a pound, but I think in the latter part of the summer they dropped to a quarter. The professor had sold some at 50 cents a pound, but they never reached the exorbitant prices which is received in the Boston markets.

Q.—Last summer in Montreal they were asking farmers to draw the chickens, and they were prosecuted if they did not.

Mr. **Brown**: This in a very meagre way, is a short description of the work carried on at West Virginia Experimental Station last summer. If there are any other questions you wish to ask about the hopper feeding, I am quite willing to answer them.

Q.—Do you use corn and bran exclusively?

A.—It was used in one particular experiment, but it was found that alone it was not very satisfactory.

I must say that I enjoyed my stay in Virginia very much, and, although I had rubbed up against some of the American people before, and had not received a very favorable impression of them, when I went down to Virginia I found them equally as hospitable and kind as they are in our own Province of Ontario. They seem to have some of that old Virginian spirit which was in the early pioneers of the State, and I enjoyed my stay with them very much.

Mr. **Tebbs**: I was at the convention last year, when I was a short-course student, and I decided that when I started to raise hens I would go by what Mr. Hunter suggested, and that was dry-hopper feeding; and all the chickens I raised—about 250—with incubators, have from the very moment of their being hatched received nothing but dry food. The way we adopted, first of all, was by feeding them freely in the brooder the chicken foods, such as Cypher's foods, and some that we got from Tillsonburg. The Tillson Company manufacture the chicken food. When they went out into the chicken houses the boys at home made hoppers. and we filled them about once a week. We tried different kinds of grain, but what we found most successful has been something like this: We got about 200 pounds of chopped oats, 100 pounds of cracked corn, and two bushels of wheat, and mixed them together on the floor and then fill up the hoppers. All through the winter we have been feeding that way. The doors have been open, and the chickens have had snow as drink. They have had no grain put into the straw at all. They have plenty of straw, but, as one friend said to-day, he thought our chickens must be very well trained, because they eat the soft food and throw out the grain and wheat into the straw, and when they want a change they scratch for it in the straw. That is the only exercise they get; they go out into the snow. So far as I can estimate, the cost of feeding them so far for eighty birds is about 75 cents per annum.

Q.—How do you supply the meat? ,

A.—The meat is beef scrap, in a box in the house, with a hole drilled in one side of the box and hung on a nail, and that box is kept nailed, too.

Q.—What is your egg production for January?

A.—About 40 per cent. for this last January. The chickens that were hatched in April and May last began to lay in November, and the yield has been steadily increasing ever since. I find that the Wyandottes are doing the most laying. The Orpingtons had the lead, but now they have become broody, and the Wyandottes are keeping up the production. From about forty-five pullets we had about 607 eggs last month. We give them mangels as green food and also cabbages. We grew a late crop of cabbages that did not mature, and we give them to the chickens now. We receive from the butcher offal, such as lights, etc., and boil them and hang them up in the house. The chickens were afraid of them at first and they ran away, but now they have got used to them. The chickens have had no change in the dry-hopper feeding, and the other men in the town have adopted it since. We are giving them grit and oyster shell as well. We have yet to test the fertility of the eggs, but the birds are all vigorous. I had one Minorca cockerel. He had a small comb, and in the same pen I have some Old Country Minorcas with large combs, very vigorous birds. The Barred Rock cockerel was badly frosted, but there is not a trace on the other birds. In this system I cull from the beginning any chickens that are weakly, and kill them at once, so as to get real, healthy, vigorous chickens, and our death rate, apart from killing, has been low.

TRAP NESTING.

By George A. Robertson, St. Catharines.

I may say that I am running a fruit farm, and it is only in the winter that I pay special attention to poultry. However, I have been much pleased in the way the discussion has taken place to-day. I may say that last year I bred almost exclusively from three show hens. They had the show qualities; they were white, and they all lay large brown eggs. They varied a little in type; the one is a little short in feather, and the other was very heavily feathered and has a little larger comb than the other two; she has a big crop and never gets heavy behind. She laid, when I started in January with her as a pullet, from twenty to twenty-five eggs a month, until I stopped trap-nesting her. I trapped her again, and she laid from eighteen to twenty-two. She laid soon after she came back from the Guelph show a year ago. Last December she went into moult, and she stopped laying for about three weeks, and then she laid on pretty well. She got broody once or twice, but she laid on well to late in the summer. From that one hen we got twenty-one pullets and twenty cockerels, and all good, healthy birds. From another hen the fertility was not quite so good, but I set the eggs, of course, under a hen, and I noticed that if the hen was a little clumsy the chickens got tramped on, and it always was the other hen's chickens that got tramped on. When I came to count up, although I had lots of chickens hatched, very few matured. In the fall I put them out on free range; however, I got some very good ones. The hen was heavy behind. That was one reason why they were not so strong in maturity, and I noticed the same fault with some of her pullets, that I was trying to test whether they were going to be good layers or not. I found that the space has been all filled up with fat, and I have had very few eggs from these well developed pullets. The other hen, very unfortunately, went off with some disease of the egg organs. Unfortunately, there are some pullets from these two hens that are not matured. They have been running out on range, and I brought them into the house, and fed them oats and meat scrap in the hoppers, and fed them wheat in the litter. I find the long-bodied ones are inclined to put on fat. I have best success from oats, but I have not anything to report in the laying, as the great bulk of them have not started yet. They are a most healthy lot, and they are gaining in size.

Q.—Have you any difficulty in getting them to go inside the trap nest at first?

A.—I have.

Q.—Can you count on any improvements in pullets in regard to trap nests?

A.—I may say that the hen I had so many chickens from this year I started the first of the year, and she laid nineteen eggs last month. They had good, strong germs in nine of the eggs. One I took and decided it was bad, and broke it open, and the chicken was still alive and kicking. They are due about to-morrow, and I am sorry I cannot report on the maturity of them. I am in for trying exhibition size of eggs, and I believe if you send out a mixed lot of eggs that you have dissatisfied customers. I want to have them show birds—good, vigorous birds; birds that will lay and hatch. I am not breeding for egg production as much as for fertility. I give them all the outside range I can, and I have not fed them mash for several years. I have had all sorts of experiences. I have a pen of mixed Wyandottes and Orpingtons. The Wyandottes laid up till the first of the year, and then went off and moulted, and they were running out in the snow with hardly a feather on them. The Orpingtons moulted earlier in the year. I have come to the same conclusion as some of these people who have had experimnts with hens, that the more you know the more you do not know. I expect to keep a record now. I did not keep the eggs separated, and I do not know the percentage as yet.

Mr. Baldwin: Can you suggest why those Wyandottes moulted this way and why the Orpingtons did not? People have difficulty with hens moulting in the winter time. I have not been bothered with it very much, but a curious thing happened. One hen in my flock moulted all by herself just about two weeks ago.

Mr. Robertson: You did not change from one pen to another?

Mr. Baldwin: They can mix if they want to, and go out when they wish to; I think something upset her. The only explanation I can give in regard to winter moulting is that it arises from your overcrowding your hens, and especially in mild weather, when they get overheated.

The physical condition of the bird might arise from the breed and the stock they come from, or the method in which they were raised might have something to do with their vigor; and birds of different vigors, although housed together, might show different inclinations to moult.

INCUBATION.

By C. A. Cyphers, Buffalo, N.Y.

In studying natural phenomena it is necessary to look for common principles. In the incubation of an egg the degree of humidity and the percentage of carbon dioxide have been taken as a common principle by other experimenters, but so far as I could ever see, the only principle common to all natural methods of incubation was the one of heat; that heat was the immediate stimulus that started the embryo to grow under incubation, and that it was the heat that kept it going throughout the hatch, and the one thing the egg could not supply for itself, or draw from the atmosphere.

I do not believe that we can take the domestic hen as the best example of incubation. She has been domesticated for so many years that some varieties have been educated away from the hatching of their own eggs, and under the forced methods which hens are kept it does not seem to me that the habits of the hen can be followed entirely as our best illustration of the correct methods of incubation. I have brought out larger hatches under certain conditions of artificial incubation than I usually secure with sitting hens.

There are conditions in which you cannot get a good hatch. There are eggs that will not successfully incubate. For instance, we can feed a duck a large proportion of turnips or other vegetables, and we will get a large, watery egg, and if we feed too much meat food we will produce the same thing. Eggs produced in Florida and throughout the southern belt will not hatch well at some seasons of the year on account of the birds eating large numbers of insects. This feeding for hatchable eggs is an element that will have to be taken into consideration when we study the phenomena of incubation. I think the public has been led astray in the use of incubators through assigning erroneous causes for poor hatches when they are secured.

There has been considerable discussion of how heat should be supplied. The hardest thing we have to do in artificial incubation is to treat all the eggs alike, and there is where a good many incubator manufacturers and a good many operators fall down, as they do not mix their eggs enough, they do not cool them enough, and do not balance up the heat with the cooling. The chick cannot be gotten out of the shell unless it is ripe. If it has absorbed its yolk food properly and is well ripened, it will come out ninety-nine times out of one hundred. If it has not absorbed the yolk, is not ripe, has not had enough heat units to ripen it, it will not hatch. It must have a given amount of heat in a given time in order to ripen.

It has not been determined what there is to the cooling of an egg that brings out a stronger chick, but I know if we do cool, it brings out a better and more vigorous chick, and one that we can make live with less work than a chick hatched from an egg that has not been cooled at all. Although a chick from an egg that has not been cooled may appear perfectly normal, we have to confine it longer and keep it warm longer, and in that way nurse it into a vigorous activity. I cannot say that such a chick will not make as good a bird as the one from the egg that has been cooled. It simply makes our brooding proposition a little harder when they do not cool. In 1895 I put up a large incubator at Stroudsburg, Pa. That machine was twenty feet square, and in the interior of it was another room with felt walls fifteen feet square. The temperature in the inner room was very accurately regulated. We admitted the fresh air and distributed the heat in such a manner that the temperature was kept within one-fourth of a degree.

Mr. **Baldwin**: Was that uniformity maintained both at the top and bottom?

A.—Yes, on any one level. As I remember it now, the difference between two levels was aproximately a degree to the foot.

The eggs hatched well in that room. While we were experimenting with that incubator, a local breeder brought us over thirteen Buff Rock eggs, and we hatched all of them. This was a 100 per cent. hatch of the eggs put in. The temperature at the top and bottom of those eggs, and at any portion of the surface. was practically the same. We operated that machine with an air temperature of 101 degrees to start with, and gradually reduced it to 98 degrees, the temperature of the thermometer resting on the egg remaining 101. In other words, the embryo had power enough to keep up the temperature within 3 degrees, and they came out in nice shape on the twentieth day. They were not cooled at all, excepting when they were taken out once in the ante-room to be tested.

The hatching of an ostrich egg in the Model incubator is just the opposite to this. A South African ostrich egg is five inches in diameter. The difference in temperature in the Model incubator between two levels is one degree to the inch. The difference of the air temperature between the top and bottom of the ostrich egg, which is five inches in diameter, is, therefore, five degrees. To successfully incubate that egg we hold the temperature on a level with the top of the egg at 98 degrees throughout the hatch, which takes from thirty-five to forty days from exclusion. Here we have a greater top heat than a bottom heat, and secure good hatches. These illustrations show the two extremes, both producing good chicks.

There is one interesting feature of hatching ostrich eggs. Inasmuch as the birds may develop into specimens worth $100 each, the operator is very careful in watching the eggs at the time of exclusion. If he finds a bird having difficulty getting out, the shell is carefully cracked until the umbilical cord is located, when this is tied and cut, after which the shell is removed without any danger of the bird bleeding to death.

I have recently received an authentic description of a Chinese hatchery and methods, located at Honolulu. This hatchery is built in an ordinary living room. In one corner is constructed a small heating closet, where the eggs are first placed. In the opposite corner is the incubating room, large enough to hold seventeen barrels, placed in two rows, with an aisle between them. It is in these barrels the eggs go from the heating room. Over the barrels are two tiers of shelves. On these shelves the eggs are finally placed to hatch. Replying to my enquiry regarding the temperature of the heating closet, my informant, Mr. Green, states that "the temperature of the heating room is that of the air of the whole room or closet, and not that of the eggs in the closet. No thermometer is used in any of his operations, nor any other device for measuring the temperature. So Yee Lee declares, and so I observed. He showed me his method of judging the temperature of an egg by placing the side of the egg against his ear and then against my ear. He also placed the egg against his closed eyelid. That, together with the "feel" of the room atmosphere, is, in my belief, his only gauge. With an ordinary wall thermometer I found the temperature of this room to be 92 degrees, and "Not yet warm enough," said Yee Lee. This heating room is a closet, built of tongued and grooved boards against the outer walls, seven feet high, six feet wide, and two feet deep. On the floor are five five-gallon coal oil cans, each with a side cut out, and filled with charcoal ashes, in the top-center of which is the live charcoal, burning slowly and feebly, in a space about three inches in diameter. Each of these cans rests within another old can of same shape, but about two inches larger each way, around which is packed more charcoal ashes. This evidently is the only safeguard against fire by spilling live coals, as he quickens the fire in one can by scooping an iron spoonful of live coals from another can that is burning better, then adding fresh charcoal of about chestnut size. There was neither smoke nor fumes perceptible, nor ventilation for such, on any of my visits. Two feet above the floor is the first shelf for the eggs. This is simply two lengths of 2x3-inch joist. Above these are three more shelves, one foot apart, of same 2x3 joist, spread a foot apart. This closet is quite dark, as tight only as tongued and grooved boards will make it, there being no lining, no paint—simply rough board walls. Its door is not hinged, but lifted into place and fastened by two wooden "buttons" on each side. To press the door closer to casement at top he uses a slight strip of wood, bracing its one end against the opposite partition (which encloses the barred room), and its other against the top of door, relying on the bowed center of the strip for pressure to force top closer to casement. Each shelf holds four baskets, and each basket holds 225 eggs. The baskets are of split bamboo, coarse-woven strips of about half an inch in width.

The eggs are simply left in the baskets on shelves for twenty-four hours. They are then removed direct to the barrel room. Other heat is supplied in the barrel room. And here, through having an interpreter along, I learned of the second heating of the eggs, a process that the clipping did not touch upon, as I remember. After the first twenty-four hours' heating of the eggs, Yee Lee heats rice "paddy," which is rice with the hull on, in a large iron pan over a fire. To what temperature he could not say, except "Not too hot," and places a thin layer of it in a kind of cushion on the bottom of the barrel, then a square of cloth containing the first layer of eggs. Three alternate layers of "paddy" and eggs start the barrels. Above these three layers no paddy is used; simply the cloth and layers of eggs. This heated paddy is renewed morning and evening during a period of sixteen days, unless he finds the eggs too warm, when he skips the heated paddy at one turning. Without this heated paddy there would be no hatch, said Yee Lee. After sixteen days he drops the paddy, as the development of the duckling is advanced to a safe point; as he says, "It has hair on to help keep it warm after the fourteenth day." The eggs remain in the barrels fifteen days in warm weather, and eighteen or nineteen in rather cool weather. From this time on no other heat is applied to the barrel room; so says Yee Lee, and I saw nothing that would lead me to think otherwise. I asked if he ever moved the charcoal heaters into the barrel room in unusually cool weather. He replied emphatically, "No." If more warmth is required in a barrel he adds eggs from a warmer barrel; if less warmth is required, he diminishes the number in the barrel by guess, there being no gauge except his eyelids or his "earlids."

From the barrels the eggs are taken to the two overhead shelves, which are about two feet from the tight board ceiling, being placed on the topmost shelf first, which is the warmest, for three or four days, according to weather and season; thence down to the lower shelf, two feet under the top shelf, and not so warm, for the next and last three or four days. They are on the shelves for ten or eleven days.

The barrel-room faces south-west, which is the sheltered side in stormy weather: also taking the full afternoon sun on wall, and on roof all day. In the tongued and grooved ceiling are three hatchways two feet in diameter, which were partly closed when we went in, and after being about in and out for narly two hours with barrel room doors wide open, at midday, he closed the door and opened wide the three hatchways, which let in the confined warm air of the roof-heated attic space, which I had felt while registering the temperature of eggs on top shelf. This room has one door at end, and one window at opposite end, with the panes of glass whitened, and a slight packing of woollen between the two sashes and their casement, which looks out on to the street. This is all on the second floor of the building.

The temperature of the barrel room I found as follows: Of the room itself, with the thermometer resting on top of rice hulls surrounding the barrels, it registered 90 degrees at midday for the two hours I spent in and about the rooms.

In a barrel of eggs in their fourteenth day of incubation I placed the thermometer against the outer eggs of the third layer from the top, and it registered (after twenty minutes) 94 degrees. The same proceeding with a barrel of eggs in their eighteenth day of incubation showed 94 degrees.

The thermometer placed tube side down, resting on the eggs (21 days along), spread on top shelf, registered 94 degrees, each time giving the instrument about twenty minutes' time to express any variation. The result was the same with the eggs on lower shelves, which were twenty-four days along—94 degrees.

The insulation of the barrels is as follows: The barrels holding the eggs are placed alongside and touching each other in a bin three feet wide and of the same depth as the barrel. An ordinary export beer barrel is used, with the rice hulls filled in around all sides to within four inches of their tops. The inner lining of these barrels is about a quarter inch thickness of Manilla paper in original fold of about a quire, tacked down. Over the top of each barrel rests a shallow tray (of bamboo strips woven basketlike), which serves to rest each cloth of eggs as he brings them up out of barrel, while he stirs them, or "turns" them. Yee Lee says that no fresh air reaches the eggs except at the turning twice a day, or as he sees fit to leave the door open to the outer room atmosphere.

The temperature of the room during the last week is the same as at all times, for in this room are lots of eggs at many stages of incubation. Some have just been placed in barrels, some are pipping and hatching, while the lots are coming on at various stages of development. On one occasion I found the under shelf charged with 1,800 duck eggs, pipping and hatching like corn in a corn-popper, as seen in Connecticut winter evenings. These four overhead shelves hold 2,000 duck eggs each.

Yee Lee's method of letting fresh air into the room is by the door only, which opens into an outer room, the approach to which is within a foot of the door leading or opening on to the latticed outdoor verandah. In warm weather he keeps the door open while turning the eggs and closed in cool weather. He also adds a gunny sack to each barrel top under the bamboo tray that always rests on each barrel top. The turning process takes him one and one-half hours, there being seventeen barrels of eggs and one empty barrel to begin next turning with. Each barrel holds 1,750 eggs. He showed me the turning process. Reaching for one corner after another of the cotton cloth, made of sheeting, he lifts a layer out on to the bamboo tray on top of barrel on his left, drops the corners carefully, and as the eggs settle slowly he places his two hands among the eggs and stirs them rapidly twice; then, gathering the corners again, places the barrel on his right and proceeds down the line of barrels. When asked if he could hatch chicken eggs by the same process, he answered, "No can."

One point I want to call particular attention to regarding the Chinaman's method is that he has learned to balance up the heat with the cooling; and another point is that the eggs are warmer at the bottom, if anything, than at the top, after the germs begin to throw off heat. With the hot paddy in the bottom of the barrels the eggs are warmer at the bottom than they are at the top, and by reversing their positions he evens up the heat, giving the eggs the approximate amount in the twenty-eight days.

Q.—What percentage of eggs does he hatch?

A.—I am trying to get that information now, but inasmuch as he buys his eggs from the Chinamen who are working on the rice plantations and sells the ducklings back at but twice the price he pays for the eggs, he certainly is hatching as well as they do on our large duck farms in this country.

My first experience with hatching eggs was with a double water-jacketed chemical bath, such as is used by chemists for drying purposes. We put a layer of cotton in the bottom of this receptable, on which we put the eggs, and covered them over with a heavy layer of cotton. The bath was kept heated by a spirit lamp and controlled by a very accurate regulating apparatus, and we got a very even temperature. The heat was applied to the eggs from bottom and sides, and I developed some of the best germs in that apparatus that I ever saw developed in an incubator. That experiment, coupled with the operation of the big incubator referred to at Stroudsburg, where there was no difference in the temperature between the top and the bottom, and the success we met with in hatching ostrich eggs where there is a wide difference, convinces me that there is no vital difference in the method of applying heat, so long as a certain number of heat units are applied to the egg uniformly over the required incubating period.

Mr. Graham: Did you ever try incubating eggs in water at the commencement?

A.—I never have.

Q.—Do you suppose there would be any advantage? Would you get a more uniform temperature? Would that be any advantage—an absolute, uniform temperature at the commencement of incubation?

A.—Such a temperature would be an advantage, but it would be nearly as difficult to spread the water so as to embrace a large number of eggs as it would be to spread air, if not a little more so. I presume it could be done, but I do not see any advantage in it. Air is the easiest managed of any heating medium we have, and while it has the disadvantage of not carrying very much latent heat, it seems to me easier to control than it would be to heat a large number of eggs with a circulation of water.

Mr. Graham: I saw in one experimental room where they were trying to start germs to hatch in water. How long do you think they could be left in the water without injury?

A.—In my judgment they could not be left in very long. An egg, when it begins to incubate, breathes the same as a fish does in water. It absorbs the oxygen first from the albumen, then from the amniotic fluid, and then from the allantoic fluid, which, in turn, is supplied by absorbing the oxygen from the air. While there is air in cold water, heating the water drives the air out. While the developing embryo does not need a large amount of oxygen, it needs a constant supply, as if we varnish the egg over so as to exclude the air, the germ dies in the course of two to three days, and the development in that time will be found upon examination to have been slow.

Mr. Tebbs: I know a man who put eggs in water glass and afterwards put them in an incubator. I laughed at the idea, and he said he tried it for fun, and they started to germinate.

Mr. Cyphers: That is not impossible. If you varnish over an egg and put it in an incubator the germ will develop for a few hours, and there will sometimes be enough air in the egg to carry on the development up to the point where the heart will beat before it will die. An egg can be placed under drying conditions so as to dry the membrane, and the same effect will be produced. For instance, I have put an egg in an incubating chamber in the path from a current of air produced by an electric fan, and the germ development was slow, and the germs eventually died. A frog, which breathes through its skin, can be kept in a dry room for several days without inconvenience. Hold him in the path of an air current from a fan, and as the skin dries he will make desperate struggles to get away; yet a frog needs so little air that it can be frozen solid in a cake of ice and will live there for weeks.

Mr. Baldwin: They are found in rocks.

Mr. Cyphers: I think those are toads. A frog breathes through its skin entirely, and if the skin dries it cannot breathe.

In supplying moisture in artificial incubation my observations have led me to believe that the effect of supplied moisture has more to do with the evening up of the temperature in helping to apply heat to the egg than that the supplied moisture prevents the drying of the membranes; that the drying of the membrane is due more to a rapid movement of the air in the incubating chamber than the lack of humidity. The incubating chamber that will produce the best results is one in which the circulation of air is slow but positive. It is the positive movement of the air that evens up the temperature. If it has no circulation of air, the temperature will be found very uneven. If in such a still atmosphere additional moisture is injected, the inequality of the temperature will largely disappear. To some extent the heat will bank up in the middle of the chamber, but the higher the degree of humidity the less variation in temperature there will be. In designing the Model Incubator a very moderate but constant circulation of air is secured. It was my conception that if a constant circulation was secured, the air not moving too fast, but just moving enough to even up the temperature, that condition would be produced which would hatch eggs and hatch them perfectly. This has worked out in practice. The air in the Model incubator does not move quite five feet a minute.

Mr. Baldwin: Do you believe in banking carbon dioxide in the bottom of the machine?

My Cyphers: Up to a certain point carbon dioxide has no injurious effect, as far as I have been able to see. I went over that matter in 1888 or 1889, making quite a number of experiments. We had found quite a high percentage of carbon dioxide under the hen, and we put sweetened new vinegar in the incubator, and other substances to bring up the carbon dioxide content in the air, without any apparent effect.

Q.—It did not affect the hatch?

A.—No.

Q.—Did you have supplied moisture or dry air?

A.—It was a hot water incubator, and it rather moist. The ventilation was through side and bottom felts.

Mr. Graham: Have you any idea what the humidity was inside of the machine?

A.—In our moisture experiments we kept the incubating chamber at 50 degrees. I don't recall whether we used supplied moisture with the carbon dioxide experiments.

Mr. Baldwin: How did you maintain 50 degrees humidity in your experiments?

A.—We had a felt bottom machine, on the bottom of which was placed a number of sponges. When we found those and the bottom felt getting too dry we had a spraying apparatus arranged by which we could moisten the sponges and felts without opening the machine.

Mr. Day: How did you read the humidity—with a wet and dry bulb?

A.—Yes.

Q.—Without fanning?

A.—Yes, always. In our experiments we found that the more movement we have in the air the greater the evaporation, and the harder it was to maintain the humidity, and for that reason we always avoided the circulation of the air.

Mr. Baldwin: What was the result of the test in that incubator in the percentage of what was hatched as far as the vigor of the chicks is concerned?

A.—If we cooled the eggs there was little difference.

Mr. Baldwin: Did you have any trouble with white diarrhoea with those chicks?

A.—White diarrhoea usually comes when you chill your birds.

Q.—Have you seen chicks with white diarrhoea inside the incubator before they were taken out?

A.—I have seen it in baby chicks hatched during the hot weather in a machine that was not properly ventilated. I have seen this condition prevail to the extent of causing blood poisoning, the back of the head having rotted away, although the chick was still alive.

Where the eggs are properly cooled there is little trouble on this score, even where the machine is not adequately ventilated. Cooling the eggs will benefit the hatch in any incubator. While a rule often needs to be modified on account of the different temperaments of the operators, I advise as a general practice the following method of cooling:

Average room temperature.	Operating temperature.	Time to cool.	
		3rd to 7th day.	8th day to pipping time.
30 to 40 degrees	103	5 minutes.	10 minutes.
40 to 50 “	103	10 “	15 “
50 to 60 “	102½	15 “	20 “
60 to 70 “	102½	20 “	25 “
Hot days	102	20 “	30 to 50 minutes.

We run with the suspended thermometer with the bulb on the higher level of the eggs. This is working by the air temperature, which is slightly lower until the animal heat develops.

Mr. Day: Would you say the immediate effect of cooling was due to the cooling, or to the extra supply of fresh air?

A.—I presume that the fresh air has a great deal to do with it, yet cooling seems to have a hardening effect. It gives a stronger vital force. It is along the same line as the practice of growing winter cabbages, which I found my friend Mr. McEvoy doing at Oil City, Pa. Mr. McEvoy is an old truckman, as well as one of the best duck men in the States, and he grows the earliest cabbages of anybody in his neighborhood. The little plants are put under cold sash in the fall, where they freeze up hard and remain in this state all winter. As the spring breaks the sash are opened more and more until the frost goes out of the ground. Earlier than any one else would dare to, the little plants are transplanted to the fields, and though the frost may come and freeze all other vegetation, it will never freeze these little cabbage plants. He practices the same thing with his little ducks, letting them out on the ground in the snow after they are two or three days old, and probably loses a smaller percentage than any man in the business. I have seen his little ducklings three days old running out in the pens where the temperature was 12° below freezing. My experience with cooling eggs is that the more we cool and still get the birds out on time the stronger chicks we get.

A MEMBER: Would not the introduction of fresh air from outside answer the same purpose?

A.—I presume it would to some extent, but as quick as we get a strong movement of fresh air in the machine we begin to get other elements to contend with. The difficulty in hatching the eggs artificially is to hatch a large number together.

Mr. GRAHAM: I would like to know in case of where you want to use some moisture in your machine how would you apply it?

A.—You could either use pans or sponges. Shallow pans containing wet sand or sawdust could be placed under the trays on strips, or wet sponges can be thrown in on the burlap of the nursery tray.

Q.—If you close up the bottom of the Model incubator you will get an uneven heat?

A.—You won't get any at all. All the heat comes in with the incoming air, and if there is no outlet no heat will come in.

Mr. BALDWIN: The only outlet in the Model is in the floor?

A.—That is all.

Mr. GRAHAM: If we made the sand tray large enough so that there would be 2 inches space around the side, would that be sufficient to give it enough ventilation?

A.—If the sand tray was suspended slightly from the nursery tray by a couple of cross strips, a 2 inch space all round the sand tray would be sufficient.

Mr. BALDWIN: What temperature do you start your machine at?

A.—We start at 103 degrees sometimes 102½ in warm weather.

Mr. BALDWIN: With the suspended thermometer?

A.—Yes. The point is that we have to give the eggs a certain amount of heat within a given time to bring the chicks out, and if we start low we wind up a little high.

Mr. BALDWIN: You heat according to the heat in the incubator room?

A.—Yes.

Q.—If the incubator room goes down to 40 degrees what would you start the incubator at?

A.—At 103 degrees.

Q.—If the room was at 60 degrees what would you start at?

A.—102½ degrees.

Q.—What would be the variation between the suspended thermometer and a thermometer placed on top of the eggs?

A.—It would be a trifle higher, and as much as a degree and a half to two degrees higher than the thermometer laid on the tray.

Mr. GRAHAM: That would be taking your temperature with a contact thermometer, 101½ degrees.

A.—With a contact thermometer we keep the temperature at 102 degrees throughout the hatch. This makes the egg temperature a little higher at the start, and a little lower at the finish.

Q.—Do you lower the temperature of the suspended thermometer as the hatch proceeds?

A.—No.

Q.—If you start your machine at 102 degrees and you keep it at 102 all through, won't the eggs be at 105 degrees at the end of the hatch?

A.—No, because we have a thermometer on a fertile egg.

Q.—Your machine comes with a suspended thermometer?

A.—The hen-egg machines do. The No. 4 Special Duck has a contact thermometer.

Q.—How do you regulate the amount of cooling?

A.—By cooling the incubator.

Q.—You open the incubator door?

A.—Yes, we leave the door open.

Q.—For how long?

A.—It depends on the outside temperature, according to the table I have given you.

Q.—Do you ever operate your machine with the door slightly open?

A.—Only on a very hot day, when we have a large number of fertile eggs in the machine and cannot keep the heat down otherwise.

Q.—What is the best temperature in the incubator room?

A.—Between 60 and 70 degrees.

Q.—Aside from the question of cost, wouldn't it in your opinion improve the method of incubation to introduce fresh air by the indirect method?

A.—That is the way the Model incubator is heated. All the air that passes into the machine gains its maximum warmth before passing into the incubating chamber.

Q.—Do you think the smell of lamp fumes in a cellar is any detriment?

A.—I do. It is the impurities thrown off that smell.

Q.—How would you go to work to build an ideal incubating room?

A.—I haven't any ideal for an incubating cellar. The large incubating room we now have nearly finished at the Model Farm will hold 142 No. 3 incubators. It is 47 feet wide and 130 feet long. It has a 6 foot tile wall and a 4 foot frame above that. There is a 6 light 10 x 12 window space every 9 feet 6 inches around the two sides, and we ventilate the room by those windows.

Mr. Graham: There is no special means of bringing the fresh aid down to the floor level?

A.—None at all. The air coming in is colder, and drops to the floor, while the hot air is flowing out at the top. I find that that way of ventilating the cellar or incubating room is the best.

Mr. Baldwin: Is the cellar above the ground at all?

A.—Part of it is in the ground 6 feet, and the balance of it is banked up to the height of the 6 foot tile wall. Above the ground is a 4 foot frame wall.

Q.—Do you use any artificial heat in the incubator room in the winter time?

A.—We like to heat the cellar up to 60 to 65 degrees before we start the incubators.

Q.—Will a draught coming from those windows strike the machines so as to affect them at all?

A.—No; we do not open the windows very much. It is not necessary. If the wind is on one side we open the windows on the other. We open just enough to keep the air smelling sweet.

Q.—Do you use any special brand of kerosene?

A.—No, but I wish they did in some parts of the country.

A **Member**: The difficulty we encounter is to get good kerosene.

Mr. **Cyphers**: In our district we get Pennsylvania oil which is the best in the country, but when we get the Kansas oil we have difficulty, and operators experience difficulty with the oil in various sections of the South. There is a great deal of sulphur in the Ohio oil, and much of the Western and Southern oils, and some of it is so heavy and poorly refined that even burning it with a glass chimney for two or three hours will smudge up the chimney. Such oils char the lamp wicks badly and give more or less trouble.

Would the weight of the oil by the gallon be any test of its purity?

A.—I am not familiar with the methods of testing oil, other than the test of using it.

Mr. **Baldwin**: Don't they test it by flash-light?

A **Member**: By the flash point on what degree of temperature it will burn.

Mr. **Njx**: It is my impression that specific gravity has something to do with the quality.

Mr. **Graham**: Then the whiter the oil is the better?

Mr. **Nix**: Not necessarily. You may have impurities that you cannot see with the naked eye. Pure lamp oil will not char the wick. For Spratt's Astral Oil we pay 50 cents a gallon at the factory at 150 degrees flashing point. The flashing point means that at 150 degrees the oil will explode. Other oils will explode at 100 degrees, so the higher the flashing point the heavier the oil will be.

Mr. **Graham**: What about the asbestos wicks? Are they any good?

Mr. **Cyphers**: If the oil is pure you can use an asbestos wick for about a week. Then the pores fill up, and it does not draw up the oil.

Q.—Do you know whether acetylene gas is used for heating incubators?

A **Member**: Does not Mr. Snyder use acetylene gas? I used gas entirely before I went to Niagara Falls. Mr. Snyder had one of those gas engines put in.

Mr. **Graham**: What is the cost to heat the machine?

A **Member**: The machine costs $150 put up right. I didn't go into it minutely. The cost of the gas is about equal to 150 flash-point American oil at 27 cents a gallon; that is, acetylene gas to heat with would cost at the same rate as American oil at 27 cents a gallon.

Mr. **Graham**: How would alcohol do?

Mr. **Cyphers**: It is too expensive, as it has low heating qualities.

A **Member**: Would natural gas do for a machine?

A.—One of my customers runs ninety of the large Model incubators with natural gas. Natural gas has stronger heating qualities than city gas. It has more heat units.

Mr. **Graham**: What about the big incubators? Are we going to get one that will run satisfactorily?

A.—We have one in the experimental room now that holds about 2,000 eggs, but I am not entirely satisfied with it yet. It will probably be built in units of 1,000 and 2,000 eggs.

Mr. **Graham**: Will the distribution of the heat, etc., bother more if you increase the size of the machine?

A.—Yes, but I presume I could treat 5,000 eggs at one time in this machine, but there are very few plants that would want to set 5,000 eggs at one time.

Mr. **Graham**: Is a small machine easier to heat evenly than a large one?

A.—Within certain limits there is no difference. The No. 3 incubators of the Model type, that hold 360 eggs, heat just as evenly as the eighty-egg machine.

Q.—Our experiments show that we can hatch with a 200-egg incubator with as little kerosene as with a 100-egg incubator. Is that usual in practice?

A.—Yes there is only a slightly greater wall area in the larger machine.

Q.—Will the oblong machine heat more readily than the square type?

A.—I haven't been able to heat the long machine as evenly as the square machine.

Q.—How do you pipe for gas?

A.—We simply bring the gas through an iron pipe to beneath the heater and use an Argand burner and a mica chimney. We can supply those burners if a person desires them. We sell them at $1.50 complete, including the pet cock, burner, and chimney.

A Member: With natural gas would there not be some objection from injurious fumes?

A.—With the incubator cellar well ventilated there is no difficulty on that score.

Q.—There is just as much difference between natural gas as there is between two coal oils?

A.—Yes. Natural gas will run all the way from 250 to 1,000 British thermal units.

Q.—Have you any explanation to make in regard to chickens dying in the shell? They get pretty well along and then die.

A.—It is a question of germ strength and attention to balancing up the heat with the cooling.

Mr. Baldwin: It seems to me your mode of cooling is rather the minimum than above the average.

A.—I hardly think so. It runs all the way from five minutes from the third to seventh day in cold weather to forty to fifty minutes at the last of the hatch in warm weather.

Mr. Tebbs: In regard to circulation, it would be an important factor to have the burlap on the nursery tray renewed occasionally?

A.—Between hatches we brush and clean it very thoroughly. We renew it only when it is worn out.

Q.—Some machines are improved by putting the burlap all over the bottom. How does your machine work that way?

A.—It will work well in warm weather.

Mr. Robertson: If you kept up the heat you would get a good hatch that way in cold weather, would you not?

A.—It would be necessary to pour the hot air through the machine too rapidly for the best results.

Mr. Robertson: I would like to know the different causes that make the chicks stick in the shell.

A.—It is a matter of balancing up the heat with the cooling so as to ripen the chick.

Mr. Graham: I was going through the colony house district of Rhode Island and saw a man taking off seventy clucky hens with 700 chickens. That seemed to be pretty good.

Mr. Cyphers: How many eggs did they put under?

Mr. Graham: They said they put in thirteen, which would make their hatch 77 per cent. of the eggs set. I never saw any anaemic chickens among those chickens that grow all feathers and hardly any bodies and long heads.

Mr. **Cyphers**: You find such chickens in brooders when the operator has kept them confined too long.

Mr. **Graham**: It is a question of getting them out in the fresh air quick enough?

Mr. **Cyphers**: More that than anything else.

Mr. **Day**: Did I understand you to say that was an average hatch?

Mr. **Graham**: That is what I saw—seventy hens with 700 chickens.

Mr. **Cyphers**: You have to take into consideration in that district they are all colony hens, hopper-fed, which means that they are all well fed. The buildings are not tight, but have cracks between the boards. The doors are left open more times than they are closed, and the bird is as near in the wild state as it could possibly be, and the eggs are naturally a pretty good egg—a much better egg than can be obtained in a tight building with a mash feed. Still, a 77 per cent. hatch is not an unusually large one for incubators. I would take 200 eggs assorted from 400 and put them in incubators, and then take the other 200 and put under hens, and would get just as good results from the incubators.

Q.—Do you think the colony method with the hopper feeding is the best method?

A.—I do not want the colony method. It is simply a question of fresh air. I do not recommend the colony method. We build our laying houses 132 feet long. There is a twelve-foot feed room in the middle, and on either side of the feed room a sixty-foot wing. Those wings are each divided up into five pens twelve feet wide.

Mr. **Graham**: Each pen having a separate yard?

A.—No, the five pens all run together in one yard, 60x100.

Q.—Do you have any trouble with frost?

A.—Very little. There are three windows in the front of each division, and below two of those there are shutters and a runway under the middle window, which we open to let the birds out. One of the large spaces is covered on the inside with unbleached muslin, and if the wind is blowing too strong we leave the shutter open on the muslin-covered spaces only. On moderate days we open both shutters, and unless it is stormy and extremely cold we open a few of the top windows through the day.

Mr. **Baldwin**: How are the windows opened?

A.—The lower sash is stationary and the top sash is hinged at the top.

Mr. **Baldwin**: How many birds to a pen?

A.—Seventy to eighty. We have 350 to 400 birds running together. I don't know what they did in December, but in January the eggs were running 81 per cent. fertile.

Mr. **Baldwin**: Your pens are what size?

A.—Twelve by twenty. At Wayland we built a house sixteen feet wide, and the roosting platform was not far enough back from the front, and when I built my houses at East Aurora I made the houses four feet deeper, and have had but few frosted combs, although some of the shutters are left open at night.

Q.—How many roosts have you?

A.—Four roosts twelve feet long.

A **Member**: When you have the birds running together do they go back to their own pens?

A.—They divide up pretty evenly. We have no difficulty on that score.

Mr. **Baldwin**: The sun does not get back inside the house to the place where they roost?

A.—Very nearly. The studding in front is eight feet six inches, and the windows are cut in just under the plate, and in the winter time we get the sun back under the platform.

A MEMBER: What are your objections to the colony plan?

A.—The amount of labor and the expense. In Rhode Island the houses are built small because there are very few days in winter when the birds cannot get out on the ground. With us we have long, cold winters, when there are months at a time that the birds do not get out of the house. We have to build a house in which we can get eggs, even when the birds are confined. To do that the birds must have room to move about.

Q.—You aim to keep your birds off the snow in the winter time?

A.—As a rule, yes.

Mr. GRAHAM: You do not want the birds to get on the snow?

A.—If we let them out on the snow, even when it is not particularly cold, it shuts off the egg yield. With our breeding ducks it acts the same way. I have seen a duck sit out on the snow until it froze fast.

Q.—Do you get many cripples?

A.—Very few.

Mr. GRAHAM: What is the cause of cripples?

A.—Imperfectly hatched chicks.

Mr. GRAHAM: Are we to gather from that that the operator is to blame?

A.—Absolutely, where there are many.

Q.—How?

A.—If he balances up the heat with the cooling there will be very few cripples. The birds will come out ripe and strong. If the birds are not properly ripened they will lie in the shell too long, and that causes cripples.

Q.—If he hatched 100 chicks and had three cripples?

A.—In that case they may have been weak germs that did not develop as fast as they should have. Their little bones harden after they begin to breathe the outer air, and we get a crooked neck or a crooked leg.

Mr. TEBBS: What is the cause of blood rings when the germ dies?

A.—When the circulation of the blood in a germ begins it does not begin in the heart, but in a little circle in the outer edge of the vascular area, and sometimes when the germ dies the blood all concentrates in this outer ring.

Mr. GRAHAM: What is the cause of the germs dying which show blood rings after they die? In some machines you see them more than in others.

A.—Uneven heat, or a chill before the eggs are put in. I remember receiving two barrels of eggs from Massachusetts several years ago during a very cold spell. The germs in those eggs developed in from twenty four to forty-eight hours, and then they all died. Not an egg hatched from the whole lot. They nearly all showed the blood ring. They were put in some half-dozen incubators, so that it was not treatment they received in the incubators that caused the blood ring.

Q.—Do you have chilled eggs in July and August.

A.—No, but we do not get as many blood rings then as we do in winter. Any germ that dies is liable to show the blood ring.

Mrs. DAWSON: Would it not be caused by a sudden shock? I was running an incubator, and the morning after the second test something dropped on the floor with a bang. That night I took out forty-two blood rings, and I cannot account for it. They appeared to be all right the first test.

A.—It would take a very heavy jar to make motion enough in the egg to rupture the blood vessel, which is the only way I can see that it would kill the germ and cause the blood ring.

Mrs. Dawson: It made the whole room shake, and I think that was the cause of it.

A.—When I first started my experimental room at my Buffalo factory we had it on the fourth floor. The factory is built on quicksand, and it trembles all the time. Notwithstanding this, we had no unusual number of cripples or blood rings.

A Member: Which are the best chickens, the chickens hatched with moisture or in a dry machine?

A.—It is a question of degree. Too much moisture is just as bad as to have too dry a machine. In applying the moisture under the Moss system, with wet cloths on the eggs, if the cloths are left on too long the ducklings come out with their eyes all stuck up.

Mr. Parber: In testing the eggs what effect will turning them back and forward have at the first test?

A.—It depends on how long you leave it before a strong light. The green operator often holds the egg there so long that he kills the germ, and when he comes to the second test he will find that a lot of birds died after the first test.

Mr. Barber: I am referring to the quick movement.

A.—I hardly think there would be anything injurious in the motion.

Q.—Is there any objection to not making the second test if we make the first test on the ninth day?

A.—No. With hen eggs the second test is not necessary.

Mr. Tebbs: In testing eggs with an electric light, will the intense light have any effect on the germ?

A.—I hardly think it is the light, but the heat. We can't get the light without the heat.

Mr. Barber: Do you know how soon a chick begins to move?

A.—Seventh or eighth day.

A Member: Would you advise anybody to use moisture in your machines?

A.—I do advise it under certain conditions. The incubator directions call for it in a very dry room, but under ordinary conditions we do not use it. There are places where it is difficult to dry the eggs down sufficiently even without moisture. In Florida, for instance, it is hard to dry them down, and they have to cool unusually long.

A Member: Do you think you can drown chicks by supplying moisture?

A.—I do not know that it is possible to drown a chick, but when too much moisture is used they come out sticky and plastered up.

Mr. Roberts: I live in the moist part of the Province, and I think I have better chickens coming from dry machines. What should be the average percentage of moisture in an incubator to secure the best results?

A.—That depends on the temperature of the room in which the incubator is run, and the construction of the incubator. An incubator in which the circulation is sluggish needs to be drier at all times than one in which the ventilation is more active. In other words, the movement of the air has more to do with the drying down of the egg than the percentage of humidity.

Q.—What percentage in weight would you evaporate the eggs to make them satisfactory?

A.—There has been no definite amount determined. Eggs do not dry down alike, and there is quite a wide limit between the minimum and maximum amount from which we can secure a good chick.

Q.—How do you judge when you have sufficient moisture?

A.—It is not a question of moisture. It is a question of the ripening of the bird—of the bird using up the yolk food contained in the egg so that it has room to move. We go by the general look of the egg, that is, by the size of the germ, the completeness with which it has enveloped the yolk food at certain stages, and the uneven or ragged edge to the air cell, to judge if the germ is developing properly.

Mr. BARBER: Is there not a greater evaporation going on with the heat in the incubator than there is with the cool air of the room?

A.—Not with a fertile egg.

Q.—I thought the higher the humidity the more absorbing power the air has?

A.—It has until the germ throws out its protecting envelope. The evaporation is then controlled by the physical action.

Q.—What do you mean by being controlled by physical action?

A.—On the fourth day the allantois starts to develop, and that spreads out on the inside of the shell, and the entire contents of the egg are eventually enveloped by it. This organ is full of blood vessels, is the organ through which the bird breathes, acts as the lungs, and the loss of moisture from it is a vital function, not mechanical evaporation.

Mrs. DAWSON: How soon after putting the egg in the incubator does the germ form—how many hours?

A.—If the incubator has been heated to its normal temperature before the eggs were put in, the germ catches that temperature and begins to grow almost immediately. The blood is moving by the end of the second day, and at the end of the third day the vascular area, which forms its first set of lungs is perfectly formed. The heart, which is simply a long tube, and is not yet divided in the middle, beats by doubling upon itself, and the blood is coursing through the blood vessels in the vascular area. If you wish to watch it, take a dish of warm water of a temperature of about 101 degrees and sprinkle a little salt in it. Unless the salt is put in, the fresh water will quickly wash the salt out of the blood, and the germ will live but a short time. Into this warm, slightly salted water break the egg, the same as a housewife would break an egg to use for cooking. As the egg strikes the water it will turn, and the germ will float on top. I remember in one instance of breaking in an egg on a warm summer evening, and after I got through looking at it I set the dish containing it on the top of my desk, where it was left all night. I was surprised in the morning to find the heart still beating. I evidently had my salt solution just right. I set the dish containing the egg in a second water pan, which was placed over a spirit lamp which I used to keep the water warm in which I broke my eggs, and lit the flame. As the temperature came up slowly, the heart beat more and more rapidly, and as it reached 102 it was beating evenly and steadily. As the temperature went up to 110 I could observe a slight jerky motion, and as it rose to 115 and 120 the motion became perceptibly more and more jerky, and as it reached the latter temperature there would be a few rapid beats and then a pause. As I raised the heat to 140 the periods between the beats would be longer, giving three or four or five quick beats and then stopping. As the temperature reached 150 there were a few quick spasms between short rests, and the action stopped entirely.

Mrs. DAWSON: I have heard so many people say in testing eggs that when they forgot to put them back in the incubator they had better hatches?

A.—This was caused by cooling. It was beneficial.

Mr. **Baldwin**: I had that experience. The eggs were left out all night.

Mrs. **Dawson**: Are the chickens strong when they do come out?

A.—In my case the results were very satisfactory.

A **Member**: Will you explain the saving of time in caring for the birds in your laying house over the colony system where the birds are hopper fed under both systems?

A.—In travelling.

Q.—Is that all?

A.—Practically all. At the present time my men take care of 2,000 birds, notwithstanding that they clean the roosting platforms every day.

Q.—Have you any method of dumping the roosting platforms?

A.—No, we have none.

Q.—Mr. Shilling claims that he can take care of 10,000 birds.

Mr. **Cyphers**: Claiming and doing it are two different things. It depends on how the work is done, how many he can take care of.

A **Member**: Mr. Shilling has cleaned some of his houses once in two years.

A **Member**: Do you not find the hens getting fat under hopper feeding?

A.—The hens sometimes do. The pullets do not.

Q.—Have you kept a flock of Wyandottes under hopper feeding?

A.—I had one flock of Wyandottes that laid better than 40 per cent. on hopper feeding. They started to lay in November, and did not let up until the following September. I filled the hopper up once a week. That is all the attention they had. The house was cleaned but twice during the winter.

Mr. **Day**: How many eggs do I understand you to say you are hatching out of 360?

A.—From 200 to 240 and 250.

Mr. **Day**: An average of 210?

A.—Better than that. These were eggs from pullets and molting hens through the fall and early winter.

A **Member**: After cooling the eggs and putting them back in the incubator how do you account for the regulator acting before the eggs get their maximum temperature?

A.—That is because the thermostat, which is the controlling factor, hangs between the eggs and the incoming air. If this were not the case the air might enter at too high t temperature and injure the germs.

A **Member**: Do you use dropping boards?

A.—Yes, for the reason that the birds can then utilize the room beneath them through the day.

A **Member**: Do you clean off the boards every day?

A.—We do at the present time. We are trying to see how we can lighten the labor so that a man can take care of 3,000 birds instead of 2,000, as he is now doing. How we shall accomplish that, or whether we shall accomplish it at all or not, I cannot say at this time.

A **Member**: Under hopper feeding in zero weather would a hen lay enough eggs to pay for her feed?

A.—A hen eats a very little more under hopper feeding in the course of a year than she will under any other method of feeding. The number of eggs she lays will determine to some extent the amount of feed she will eat.

Q.—Do you put whole grain in the hopper?

A.—We crack the corn, but use the barley and wheat whole.

Q.—Do you use any dry mash?

A.—We are not using dry mash this winter.

Q.—Do you scatter any grain in the litter at all?

A.—No. It is all hopper fed.

A MEMBER: Have those hens you speak of been used to the hopper-feeding method ever since they were hatched?

A.—Most of them since the day they were hatched.

Q.—Have you never tried to put laying hens on the hopper-feeding method that were not raised with that system?

A.—Yes, and sometimes it works and sometimes it doesn't. It depends on the condition of the bird. Occasionally a flock will pick right up in egg yield, and then again it will be six weeks before the birds will begin to produce.

Q.—Do you find in feeding from the hoppers that the birds eat and then stand around listless for the rest of the day?

A.—As long as they produce the eggs I don't care what they do.

Q.—Do they produce a good fertility?

A.—Yes. The fertility was running 81 per cent. in December, and will run up 90 or 95 by April. We get a better egg by hopper feeding. With hash feeding we sometimes get a good hatching egg, but more often we do not.

Q.—You do not even like the system of throwing a little grain in the litter occasionally?

A.—It makes that much more work.

Q.—It is the work that keeps you from doing it?

A.—And the lack of apparent gain.

Q.—You do not study to keep the hens busy? You simply study to save work?

A.—We study to produce results. We want the best results with the least labor that will produce it.

A MEMBER: Don't you think on small plants where the labor is not so great that a little grain scattered in the litter would cause the birds to exercise and keep them healthy?

A.—We get just as good results hopper feeding, and we lose less birds during the winter than when we gave mash feed.

MR. DAY: Will you explain about the heat? You mentioned the fact that a certain amount of heat units were necessary to hatch eggs. How do you determine how much it is?

A.—Only by the way the bird is developing. It takes certain conditions to ripen a bird in the egg, just the same as it takes certain conditions to ripen a berry, a peach, a pear or any other fruit or vegetable, and the nearer those conditions are to being right, the better the product.

MR. DAY: That is just the general conclusion you have come to?

A.—Yes.

A MEMBER: Do you base all your results on that fact? Do you suppose all the chicks that are crippled and die in the shell are due to that fact?

A.—From the fact that when we do get the heat balanced up with the cooling we get the desired results. A point in instance: The young man that runs the incubator room at our farm was away for two weeks on a wedding trip. During that time we turned the incubators over to another operator, and until we could get him to cool the eggs and hold the temperature the way we were doing it, we did not get quite the results that we had been getting, and that follows out every time we make the experiment.

The incubators are practically automatic, and any operator can get fair results, but to hatch every hatchable egg requires a careful operator.

Mr. Day: Is there any way of determining by the look of the eggs how much cooling should be given them?

A.—Only approximately. It is a question of judgment in observing the development of the germ. One cannot tell another how to do it to a nicety any more than you can tell them how to test the eggs the first time without error, or determine when a watermelon is just ripe. Experience counts for something in hatching eggs, as it does in everything that men do.

Mr. Day: Have you ever tried setting several machines at the same time and collecting the individual eggs that there seemed to be more difference in and in treating those eggs differently?

A.—No. There would be nothing to be gained by it. As long as there is a difference in the strength of the germs there will be a difference in the development. We can only judge by the average condition of the development of many eggs.

Q.—How many dead chicks do you generally get in the shell?

A.—It depends on the season of the year, and on the strength of the germ. The germ that dies under good treatment before the tenth day is too weak to develop to maturity under any system of incubation. This same statement would apply up to the fifteenth day to some extent.

Mr. Day: Have you the averages of any hatches under hens—a large number of hatches, I mean?

A.—No. I had at one time, but do not recall them now.

Mr. Day: They were not as good as you were getting out of the incubators?

A.—As I remember it, they were approximately the same.

Mr. Graham: The hen in her awkwardness tramps the chicks, which probably brings down the percentage?

A.—I think that can be prevented largely in the manner of making the nests. Still, I have not any use for hens hatching. From the last five I set I got 22 chicks. They were poor eggs, but the incubator at the same time, on the same eggs, gave me a 60 per cent. hatch.

Mr. Day: As the result of actual count of all the hens set this summer we have a hatch of 85 out of the fertile eggs, and a hatch of 71.5 of the total eggs set from the hens as an actual count. In the dry machines we have 71.8 of the tested eggs as compared with 85 under the hens, and 63 of the total eggs set as compared with 71 under the hens.

Mr. Cyphers: There is a difference in the handling of incubators. I can give you the experience I had on a large poultry farm where they are using nearly one hundred of my machines. There were two operators, one operator taking care of the machines in one-half of the room, and the other the other half. The eggs were divided up each day as they were gathered, and one operator averaged over 78 per cent. of all the eggs set during that season, while the other operator brought off something like 67 per cent. I visited the plant several times during the season until I finally located the trouble. The incubating room was well arranged and ventilated, and both operators had an equally good chance. The eggs were running very good indeed, and they were getting a strong germ. I stayed one evening talking with the manager until one o'clock, when we went out and went over the machines. The machines taken care of by the lad who was not getting the results were not as nicely regulated as they were on the other side of the room, and the difference in the temperature showed that he had not tested up carefully and taken the necessary pains to keep the thermometer on a fertile egg. They were running with a close-contact theremometer. The machines were given to a man who looked after those points more carefully, and the hatches improved.

There is a great deal, too, in feeding for a good egg. Feeding shows more quickly on a duck than on a hen egg. We can feed a duck so as to get almost any kind of an egg. I remember one customer who was not getting any hatches at all to speak of. He took out as low as nine ducks from one machine. I found after careful inquiry that he was giving too much mashed turnip. It was producing an extra large egg, but an egg that was watery and of poor quality. He cut down the turnip, and within a month thereafter his hatches began to improve.

Mrs. Dawson: What effect would cabbages have?

A.—I think any vegetable food given too liberally would have the same effect.

Mr. Robertson: If not mixed they would not eat more than they needed?

A.—Probably not. The incident referred to is simply an illustration of what we run up against among mash feeders who force their birds to eat what they do not want.

Mrs. Dawson: How do you feed green food? Do you supply the hens every day with something?

A.—We have been hanging up some cabbages, and they clean them off by noon. We gave them sugar beets as long as they lasted; just a little for a relish. I believe green feed is a good thing to keep the birds in condition. Still, in one experiment on a pen of Barred Rocks I gave them no green food at all during the winter. Two or three times during the winter I fed a bag of wheat screenings, but this was the only variation from the usual feed of wheat, barley and cracked corn.

Mr. Graham: There is one thing about incubation, about the turning of the eggs. How soon do you turn them after they are put in the machine?

A.—The evening of the third day.

Mr. Baldwin: When you don't turn the eggs for the first three days, don't you take the trays out and turn them?

A.—Yes, we turn the trays after the first day.

Q.—Is there anything in having regular hours for turning and cooling the eggs?

A.—We try to have regular hours for the work. The more regular and methodical the operator is in his work the better hatches he will have.

Mr. Tebbs: Do you think a thunder storm will affect a hatch?

A.—No, I do not think so.

A Member: Will it affect a hatch with a hen?

A.—It might be possible if the lightning struck near her.

Mr. Tebbs: What cellar space do you need for a machine holding 250 eggs?

A.—We put the machines as close together as they will go. In a room holding six to ten machines we make the ceiling eight feet high, and nine feet for anything above that. The cellar at the Model Farm holds 142 incubators, and is ten feet high.

Mrs. Dawson: Supposing you were hatching in a room above the cellar that had about five feet of water in it, would that have any effect on the incubator?

A.—I do not think so.

ARTIFICIAL INCUBATION.

By L. H. Baldwin, Deer Park.

Mr. Graham asked me if I would be prepared to discuss the question of artificial incubation, and I might as well take the time now to speak to you.

We have heard a great deal about this CO_2 (Carbon dioxide), and perhaps the history in connection with it is a little bit curious, as far as my experience has gone. After making for a number of years what was acknowledged to be a considerable success in artificial incubation, then upon changing my conditions, enlarging my poultry plant, and erecting a special incubator cellar, I ran right into this trouble of white diarrhœa. The question for consideration that came to my mind was what was the distinction between the two conditions under which I had operated my incubators. The fact was that in one case, I had two incubators in a very large room, in the other case, I had six incubators in a comparatively small room, and as there was in one case six lamps burning continuously night and day, even with the windows open, and in the other case only two, this led me to believe that the CO_2, produced from the lamps, was proving injurious in the one case, while it was not felt to be injurious in the other. I therefore thought that the best thing I could do, was to get away from the CO_2, and to do so by introducing a systematic method of ventilation.

Now it seems from this scientific investigation made by Mr. Day, that in the natural condition under which eggs are incubated; there is a high percentage of carbon dioxide in the air under the hen. I do not think that the fact that they ascertained this large amount of CO_2 under the hen is after all in real conflict with the other, because, we must bear in mind that while the carbon dioxide may be increased by the burning of the lamps, there are other gases given off in the combustion of coal oil that are more poisonous, and probably have more injurious effects on the embryo life in the eggs.

Just the day before I came up here a doctor in Toronto called my attention to an article in the *British Medical Journal* of December 22nd, 1906, by Dr. Henderson on "Acapnia as a Factor in Shock," and I found it particularly interesting on this point. I will give you his conclusion and some of the illustrations he made. We are told that in the fœtus of animals the blood shows a higher percentage of carbon dioxide. In breathing—we do not entirely empty our lungs every time we breathe. When we draw in fresh air, the fresh air comes in more heavily charged with oxygen, and it mixes with the air in the lungs and this becomes more heavily charged with carbon dioxide, and consequently in our lungs there is much higher percentage of carbon dioxide than there is in the air we take in fresh to our lungs. We must admit of course, that in nature things are balanced for a purpose, and the evidence that the carbon dioxide and the oxygen is balanced, and is balanced for a purpose, is shown by the experiments he made. For instance, if you will force yourself to breathe quickly several times and thus dilute the carbon dioxide in your lungs, you will find you then will naturally want to stop breathing, you do not want to breathe for a time, and the argument is that you have emptied the lungs as it were of carbon dioxide, and you have to stop breathing in order that the carbon dioxide may again acquire its proper equilibrium.

Dr. Henderson made some interesting tests to show that the effect of admitting more oxygen into the lungs increases the palpitation of the heart;

it affects the amount of blood driven through the veins, which of course, may have an injurious effect on human life. He thus experimented with some animals, and when the dilution of carbon dioxide in the lungs was carried to an extreme extent, the shock was so great that it caused death. That may lead us to understand why there should be a proper equilibrium between the oxygen and carbon dioxide in the air surrounding the eggs during incubation.

To some extent after all, it may be necessary to have more carbon dioxide than is found in fresh air surrounding the eggs in an incubator. Just exactly how that is to be produced, we have yet to find out; whether by reducing the amount of ventilation in the incubator or not I am not sure. In the years 1904 and 1905, I had a disappointing experience with heavy mortality in my artificially hatched chicks, and not only this, but the development of the birds later on was most unsatisfactory. After killing the cockerels for table purposes they were disappointing. We had great difficulty in putting flesh on them, even with heavy feeding. I had difficulty in getting satisfactory results from the pullets; they laid very small eggs, and they continued for a long time to lay small eggs. That disappointed me very much indeed, and that continued for two years. I then installed a very complete ventilating system to improve the air conditions in my incubator room.

In each corner of the room there is a 6-inch drain pipe coming down through the earth and into the foundation, and rising in the room about five feet so that cold air is supposed to go down these tubes and be supplied in the room at a more moderate temperature. Then I trap all the fumes from the lamps of my incubators. I have tin cones that come down over the lamps and catch the hot air, which is then carried off in pipes which run to one point in the ceiling of the incubator room, and there in one large stand pipe runs up clear through the roof of the building.

Like all ventilating systems that in theory should work just so, in practice you will find them at times working backward. I found that true to a certain extent. The air in these tubes would be either coming into the room or going out. I do not believe you could detect the slightest odor of coal-oil lamps burning there, and the air of the room was just as fresh as you could make it. In the cold weather I keep the windows shut.

I know that Mr. Graham was having better success with lower temperatures, and he was of the opinion that I ran my incubators rather too high, although in my past experience when I was making a success of artificial incubation, I was undoubtedly getting better results with rather high temperatures than those given with the directions furnished by the Cyphers Incubator Company. For instance, when their incubator was brought on the market, the first directions I received said that I should run the temperature at 102½ degrees on the eggs; Cyphers' incubator directions were to run the temperature somewhat lower. I think 103 to 104 degrees is the better temperature taken on the top of the eggs.

In operating my incubators I found that when I took the eggs out of the incubator to turn them during the early period of the hatch, the animal heat would go out of them very quickly. When the chicks incubated under cooler conditions hatched, they struck me as being a very "flabby" lot, not as bright and active and thrifty, as chickens hatched under higher temperature; but wishing to profit from Mr. Graham's experience, I started off running my incubators last season on rather lower temperatures. At first the results looked encouraging; the percentage of fertility of the whole of the eggs set was 71 per cent. and the germs looked promising. I started my second machine also at a low temperature, and the third machine at a low temperature. The first tests in both of these machines I called fairly satisfactory; but when the first machine hatched, it hatched badly. The chicks were not strong chicks, and as a matter of fact, at the end of two weeks time I had none left. That showed me that I was not getting nearer my goal,—in fact I was getting farther away from it—and the question was raised, was I running machines at a high enough temperature? I at once raised the temperature of the second machine which had then run about two weeks, and the temperature of the third machine which had run about a week, hoping that I might make up for the loss of heat during the first period of the hatch, and I may say that the result in these three hatches was practically a complete failure.

Then I tried running the temperature higher, and took the temperature under the hen. It is difficult to get the exact temperature under a setting hen. The way I did was to take an ordinary clinical thermometer; then take a piece of paper, and by cutting two slits, I took the clinical thermometer and slipped it in and out through the slits. Then I went to the hen and placed that thermometer under her upon the top of her eggs and I took that as being a fair test. The temperature I found varied from 103½ to 104½ degrees. I argued from that that I ought to run my incubators at as equally a higher temperature on the top of the eggs.

Then I look at my records. The method I adopted for keeping records for the sake of comparison is this: You have got to bear in mind the hatchability of the eggs as distinct from the hatchability of the machine. I look at the hatchability of the eggs in this way. First the number of the eggs that are fertile, then the percentage of chicks I get out of the total. You know if you have a flock of birds which show a poor fertility, my experience is that you must look for a poor hatch. If you have a machine that has good powers for hatching, it cannot make up for the lack of fertility in the eggs. Having obtained a certain number of fertile eggs in the first test, then I take the percentage of living germs in the second; this percentage shows the ability of the machine to develop the eggs that are fertile, and the second percentage I take as the result. That is, I count up the number of live chicks and find out what percentage they show out of the living germs, and I multiply thes two percentages together, and that gives me what I call, the hatchability of the machine.

Then, with regard to the temperature, I divide the period of hatching into four sections; the first four days as the days in which the germ is started. I want to know what is the best heat to start the germ; then I take the average of the first ten days as being the temperature at which I develop the germs; then I take the average from the eleventh day to the eighteenth day, which continues the development of the life of the chicken in the egg. I make this division because, undoubtedly, there is a change in the egg on the eleventh day, the life "quickens." The animal heat we know, rises on the eleventh day; and then I have the record of the temperature on the last three days to show the temperature to which the chicks are subjected to, just before hatching.

I went back over the four years of my records and struck the averages. I struck the averages of the percentages in hatchability. I took those that came above the average, and those that came below and I find that the average of the higher averages were the ones with the highest temperature in the beginning of the hatch. When I again divided these up, I found the highest of these were the best percentages; that led me to the conclusion that generally speaking I ought to run my incubator at a higher temperature.

Mr. Nix referred to the work by Dr. Derests, who was investigating the cause of deformities and experimented with eggs. It gives some most interesting and suggestive results along this line. When he put the egg under a comparatively low temperature but still a temperature that was sufficient to develop the germ, that germ would in eight days, if I remember correctly, develop a chick just to the point that a chick would develop ordinarily in twenty-four hours. If you then apply the proper heat to that germ you can never develop it up to the point of living; it would increase and grow but its growth would be slow and sluggish, and in the course of time it would die before it was excluded. Without going to that extreme, I think I have seen the same thing happen with regard to incubation. I have noted in running an incubator at a rather high temperature for the first twenty-four hours, continuing it for two or three days, that you get more vigorous development of the germs. That was shown right throughout the hatch in this way, that where I would set the machine at a low temperature, the increase of the animal heat in the egg would be slow, and even if later on I increased the temperature of the machine, I could not increase the development of the germs as indicated by the amount of animal heat. You know the variation between a suspended thermometer and a thermometer on the egg will be say three degrees to begin with, it will come to two degrees and then to one, and ultimately the temperature on the egg may be higher than the temperature of the suspended thermometer. With the high temperature to begin with, the animal heat of the egg would increase so quickly that on the tenth or eleventh day it would be equal to the temperature of the suspended thermometer. If you started with a low temperature, you probably would not bring the temperature of the eggs so as to be equal to the suspended thermometer until the fourteenth, fifteenth, or sixteenth or sometimes the seventeenth day, so that led me to the conclusion that perhaps we ought to consider more minutely the temperature that we give to the eggs for the first twenty-four hours possibly for the first, second and the third day, and to make comparisons between the incubators with similar eggs.

Of course in making this comparison, I mean that after the fourth day the two incubators would be run at similar temperatures. Now what bearing has that on this question of "white diarrhœa?" It has led me to suppose that in running my incubator at a higher temperature during the past season, I undoubtedly hatched an entirely different chick. That in dissecting some chicks that died I found the yolk was almost entirely absorbed. Certainly they were in a most natural condition. I could not see any reason why they died; there was no evidence of white diarrhœa. I know in some chicks we had later on, I could not find a particle of the yolk left, it was absolutely gone.

Then the development of these birds during the summer was most satisfactory, and in the fall, during the months of October and November, these pullets were growing like the birds do in the summer. The pullets began to lay with a small egg, but almost immediately the size of these eggs came up. I must admit that my percentages as a whole in the hatching was low; that may be due to the fact that I was breeding to a considerable extent from stock that had been improperly incubated the previous year.

I had one curious experience. I sent forty dozen eggs to a man in Quebec, and they had about 36 hours railway journey. I sent him twenty dozen in the first lot (240 eggs), and I told him that no matter what the directions were which he got with the incubator, I wanted him to run the incubator at a high temperature and to keep the temperature on the eggs at 102½ degrees. When these birds hatched he got 197 chickens out of the 240 eggs I sent him. He afterwards got twenty dozen more, and out of the forty dozen he secured from me he reported a hatch of 77 per cent. of the total eggs, which was considerably higher than my own results at that time. That leads me to observe that I found the ordinary incubator thermometer most unsatisfactory. I had, I suppose, fifteen or twenty thermometers, and I found that they varied greatly; on testing them by a standard thermometer, and recording their variation, there would still be a variation in the same incubator, place them as accurately as you could. I found there was great variation between the thermometer mounted on metal and those mounted on wood. With a large bulb there would be considerable variation from one with a small bulb, sometimes two degrees, in some cases three degrees. What happens? Suppose you buy one of these thermometers, and you are told to run the machine at 102½ degrees, and you have a thermometer that may be a degree high you are really then only running the eggs at 101½ degrees. The next man may get a thermometer that is 1½ degrees too low, then if you run that same thermometer at 102½ degrees you are really running these eggs at 104 degrees, so that so far as these thermometers are concerned they are very unsatisfactory.

Then I got a "veterinary thermometer," which of course is far more accurate, and I used that in taking the temperatures. I refer to that point to show how one may be misled in running their incubators with thermometers that are supplied by incubator manufacturers. You must remember that these thermometers do not cost very much, as they are turned out by the factories. They are cheap and unreliable. Now I think along with that comes the question that a good deal of the difficulty was overcome by cooling, and I think that if you will give the higher temperature to the eggs in the first few days in incubating that they seem to get a characteristic vigor, and that they will then stand and perhaps require more cooling. With regard to the question of moisture, that is a difficulty in my mind. We know that Mr. Graham, of the Ontario Agricultural College, in using the "New Prairie State" machine, is keeping water constantly in the incubator. He has shown some tests made as to the evaporation that takes place in the egg, and comparing it with its hatchability, and the conclusion he came to was that it had really very little to do with it; that one egg would evaporate a large percentage, another egg would evaporate a small percentage and would hatch absolutely as strong a chick. We hope we are going to get from Prof. Day's work some use for the water, but the point comes to my mind that the question of ventilation in the incubator especially in the very earliest stages of the hatch must be considered very carefully. They used to say open or close the ventilators as you see the egg evaporating.

My experience led me to the conclusion that the ventilation had little or nothing to do with the increase of the air cell. Each egg seemed to control its own evaporation, but I think the old directions that the incubator manufacturer gave us years ago were to keep the incubators closed at the early part of the hatch, and to open them as the hatch progresses, may have had some bearing on the question of carbon dioxide. Mr. Day has told us the amount of moisture that the eggs give off that maintained the humidity, in the incubator if the ventilators are kept closed. There may be something in the effect of carbon dioxide inside the machine, by not allowing so much ventilation. We know that the Cyphers' Incubator Co. and the "Model" machine have provided open bottoms to give fresh air. I think that probably is a good idea, so far as the later period of the hatch is concerned, but I believe that that may be a little bit of the cause of the difficulty we have had in incubating, that there is too much ventilation—too much fresh air—in the earlier part of the hatch.

Mr. Tebbs: To determine that point I put a covering over the eggs to prevent the circulation of air during the earlier portion of the hatch. I do not see that it made any difference in the development of the eggs.

Mr. Baldwin: I would like to say before closing that Mr. Graham and I had great difficulty in finding a case of white diarrhœa with the ordinary broody hen hatching chickens. But my attention was called to it last summer, and Mrs. Dawson won't mind my mentioning it. She told me she had a case of it on her farm, and I will describe the condition in which it was found. There were three hens that were set under the same conditions, and the chickens that they hatched were practically cooped in identically the same way. The white diarrhœa developed entirely with the chickens that were hatched under one hen.

A Member: Did the hen stay off the eggs long?

Mrs. Dawson: No; I watched them very closely.

Q.—Did they have the same amount of eggs?

A.—There were three hens set in the same packing box. They appeared to be good, strong chicks when they came out, and when they were two or three days old I noticed one with it, and then three or four got it.

Mr. Baldwin: With regard to the hens, I can quite conceive how it would occur, just through the lack of heat. It has been explained to me in this way, that if a hen becomes broody, its natural temperature does not rise; she only applies more heat to the eggs from the breast. A doctor in Toronto explained the thing to me, that it might possibly be the effect of a nervous condition. We can see that in a human person by blushing; there is a rush of blood to the face, and that will produce heat. There are some persons who have that sort of nervous make-up that nothing will make them blush. Some hens have nervous make-ups, that while they get broody they do not give quite enough heat to their eggs during the process of incubation, and the chicks they hatch consequently would not have that vigorous development. Increased heat increases the circulation of the blood, and with the colder conditions in which that hen hatched her eggs might cause the white diarrhoea, and as with the artificial hatching of the eggs this might be overcome by raising the temperature.

Mr. Graham: There is a question comes in on moisture. Had you moisture present in a very low temperature, would not you get as much stimution as you would in a dry machine at a high temperature?

A.—That is quite possible. I ran my machines without moisture, and I have always done so except in two machines. I put moisture in just before the chickens are hatched.

Mrs. Dawson: What condition did Mr. Graham find those chickens in when you sent them to him? Was there any difference?

A.—There was some slight difference, but not enough to say much about it. The seeca was not in just the condition that we often find incubator chickens. There was not a clog in the seeca, though it appeared to me that that particular cause might have been due to a chill, possibly, or indigestion.

Mr. Robertson: When you ran the incubator where there was no ventilation did you have good luck?

Mr. Baldwin: No. The incubator men say to turn the trays and always reverse the trays so as to even up the heat. My curiosity with regard to applying the various temperatures in the starting of the germs, and in the development of the germs, led me to try this experiment. I have a small machine, in which the tray holds a hundred eggs. I tipped that machine so that I got an uneven temperature, and I never reversed the tray. There was an uneven temperature, and I had the best hatch of the season. I divided my eggs evenly between the four sections of the tray. I have a number of Wyandottes running with a farm tenant, and I use his eggs in my incubators to supplement mine. The chickens are running free, and the eggs hatched very well indeed. I took sixteen of his eggs and put into each section, and I took nine of my eggs, making a total of 100. With the suspended thermometer hanging in the middle of the egg chamber I had four other thermometers, one on each section of the tray. When I took that tray out to turn the eggs, these were shuffled around, but all kept in their own section. I took four readings a day, taking the standard readings of the suspended thermometer and the four thermometers on the eggs.

I have worked the whole thing out in averages, and the result in No. 1 section was that out of 25 eggs I hatched 16; in No. 2 out of 25 eggs I hatched 22 chickens; in No. 3 out of 25 eggs I hatched 17, and in No. 4 I hatched 12. That was 67 per cent. of the total.

Mr. Day: Did you know which side of that tray was the front?

A.—Yes. That is a machine built by the Toronto Incubator Company.

Mr. Baldwin: I might say that I weighed every individual egg, and I noted the evaporation and the loss of weight in each section. When I came to hatching the eggs, I evened up the temperature of the machine and divided my incubator into three sections; that is all I could do. I put Nos. 1 and 4 in one section, and Nos. 2 and 3, each in one, and I was able to toe-mark the chickens. Then I recorded the mortality, and out of 67 chickens in two weeks' time I had 61; in No. 1, where I had 16, I raised 14, and in No. 2, where I had 22 at the end of two weeks, I still had 22; in No. 3, out of 17, I had 14, and in No. 4, out of 12, I had 11.

Mr. Rice: What were the temperatures?

A.—The temperatures averaged in this way: In No. 1 section the temperature for the first four days was 101.9 degrees: to the tenth day, 101.8; and up to the sixteenth day it was 102 degrees; in No. 2 the temperature went to 102.7 degrees, then 102.6, and then 103.4 degrees.

A Member: That was on the eggs?

A.—Yes. I have not taken the four temperatures on the eggs during the hatching, because I could not do that with the thermometer lying on the egg, because the first chick that came out knocked it over. In No. 3 it was 104.1 and 104.8 degrees, and in No. 4 it ran up to 102.8, 102.7, and 102.4 degrees. The total averages of the temperature were 101.9, 102.9, 104.4, and 102.6. The hotter end of the machine did the better hatching, and the section starting the eggs at 102.7 degrees, which is nearly 103 degrees, was the best result. There is one other interesting point, and that is this, that in No. 3, where the temperature was highest, the temperature of the thermometer on the eggs equalled the temperature of the suspended thermometer on the eighth day, and that showed an extremely vigorous development of animal heat. In No. 2 pen, which was the next hottest, the temperature came together on the twelfth day, and in the fourth section the temperatures cames together on the fifteenth day, and in the coldest section they came together on the sixteenth day. That carried out that same conclusion that I came to before—that the amount of heat you apply to the eggs during the first twenty-four hours has a direct bearing on the animal heat right through the hatch, and, I think, gives a certain stamp of vigor to the embryo chick which probably lasts its lifetime, and I would suggest that for a point to consider for those who are going to start incubators during the coming season.

Q.—That is the suspended thermometer?

A.—The suspended thermometer for the first four days was 104.4 degrees, up to the tenth day 104.3 degrees, and then I reduced it to 102.2 and 102.9.

Mr. Rice: What do you call a safe temperature at which to operate the first three days? You speak about giving high temperature; somebody may go too high.

A.—It seems to me 103 on the eggs; it must be an accurate thermometer. It seems to me if you have an accurate thermometer, 103 degrees is a fair temperature for the eggs. I would not be afraid if the thermometer went up to 103½ or 104 degrees, but I would prefer keeping it at 103 degrees on the top of the eggs. The description given in the Government report at Washington on the method of incubation used by the Chinese showed a complete change on the tenth day; and, as far as I can see, for the first ten days they were in such a closed condition that there must have been very little ventilation, and there must have been a very uniform temperature up to the tenth day.

BROODING.

By J. L. Nix, Homer City, Pa.

On the general subject of brooding, I will say that my experience has largely been limited to lamp brooding and outdoor work. Brooding on an extensive scale has been more a matter of observation on my part than anything else. Sometimes observation is valuable, and sometimes it is not; it depends on the observer. I think the consensus of opinion is, at the present time, that the large pipe brooder is not an entire success. Although a number of people have made a success of them, yet there have been too many failures, and the present tendency is to use some form of individual nursery lamp brooder in which the temperature and conditions can be more accurately controlled the first few weeks of brooding. The brood at a later period of growth can be transferred to the regular pipe system, and the development completed when the temperature conditions are not so essential. That applies more particularly to winter rearing. When chicks are reared in the natural season, spring and summer, I prefer the outdoor system. Rearing in the open range has the advantage of producing birds of greater vitality.

There are two fields to be considered in the artificial process—the large commercial plants, and those that raise chicks in a small way. The subject deserves the greatest consideration from the side of the small grower from the fact that 99 per cent. of the poultry is produced by farmers and those who use natural methods, or one or two incubators. Our main poultry production comes from the farms, and those methods that are adapted to their use should receive our best attention. Some farmers raise poultry extensively during the winter time, but they are exceptional. In the soft roaster districts they hatch their chickens in the autumn.

They get well started before the cold, rough weather comes, and are transferred from the brooder houses to small colony houses, and then marketed in the spring. To start chicks successfully during warm weather in the fall almost any kind of a brooding apparatus may be used, but when it comes to brooding chickens out of season, during the months of December, January, and February, we have the most difficult problem with which the artificial method has to deal. To raise them successfully requires more than a perfect brooder. The stock that produces the eggs must be strong, well housed, and carefully fed, so as to secure eggs with a maximum amount of vitality. They should be placed in the best incubator obtainable, one with the highest hatching power, so as to secure the maximum amount of vitality in the young chicks. The arrangement of the brooder house and brooders must be almost perfect, and feeding carefully looked after to secure the best of results.

Many brood houses are heated with the pipe systems. The open pipe system has the advantage of perfect ventilation, but can be criticized because it keeps the brood room too warm, and the chicks cannot withstand the change to out of doors; while if the other style of pipe system is used—the enclosed hovers—the brood house can be kept at the proper temperature, the temperature can be controlled in the brooders with a regulator upon the hot-water heater, but the difficulty is with the ventilation in the enclosed brooders. The ordinary person will succeed the best with the individual lamp brooder, from the fact that each flock is surrounded by those conditions which best suit its age or number. For winter rearing the brood house is heated, if made small, with an ordinary stove or the large brood house with a hot water heater and a coil of pipes upon the rear wall. The house is heated just comfortably for the chicks during the day. If the fire accidentally goes out during the night the chicks are perfectly comfortable and safe in the lamp brooders. It is advisable to have a regulator on a nursery brooder, just as essential as a regulator upon an incubator. It is a time saver and a valuable acquisition.

A MEMBER: Do you think a brooder needs a regulator on it?

A.—That depends on the operator. A skilled operator may not require a regulator, but the average person will succeed best with the regulator.

A MEMBER: Do you advise keeping the food in for the chicks all the time?

A.—Not the first ten days; after that hoppers may be used. One of the first types of brooders for large plants put on the market was the ordinary pipe system, with hover top and curtains on each side, in which the chicks could run inside and out. There are a multitude of modifications of that brooder. Another type had a tight board back and, in place of the curtain, a hinged front. You can see this at the Niagara Farm. A regulator is used on the heater for maintaining a uniform temperature of the water in the pipes, then the temperature in the pens is controlled by admitting more or less air through the hover tops. The hot water heater regulator keeps the first pen at a proper degree of heat; in the other pens the temperature is controlled by ventilator slides in the hover tops—three or four openings, three inches in diameter in each hover top.

MR. BALDWIN: Are the chicks put in there direct from the incubator?

A.—They were last season. They are trying lamp brooders this season.

MR. GRAHAM: They are always looking for improvement?

A.—Yes. Another development of the pipe system was the open pipe, containing from six to eight pipes, about seven inches from the floor. No hovers are used. The temperature can be maintained to perfection. You can have an unlimited amount of ventilation. The first few sections are usually covered with a light cloth screen, to throw the heat down to the chicks. I have seen those brooders used in and around Boston. Some people are successful with this system and others are not.

A MEMBER: Is not the cause of so many chicks dying because conditions are not right for the first two weeks?

A.—I think that the first ten days is the critical period in a young chick's life. I do not know whether Mr. Cyphers would like me to give a drawing of his brooder or not. (Mr. Nix then proceeds to draw a diagram.)

Mr. BALDWIN: The passage way for feeding and clearing is down each side?

A.—Yes, over the shelf brooder.

Mr. BALDWIN: Those shelves are six feet?

Mr. CYPHERS: Eight feet across and glass on top. The hover is twelve inches wide; now we have increased that.

A MEMBER: How is the fresh air supplied under the hover?

Mr. NIX: This is a single curtain, and the heat comes through here. I do not know whether it reaches to the floor or not.

Mr. CYPHERS: It does not reach to the floor.

Mr. NIX: The fresh air comes in through the slits in the curtain.

Mr. BALDWIN: How long would those pipes be in each section?

Mr. CYPHERS: Full length of the house—150 feet.

Mr. BALDWIN: One pen?

Mr. CYPHERS: Yes, divided up every two feet; on the top shelf there are two feet on the top, every three feet on the second, and every twelve feet on the third.

Mr. BALDWIN: Which is the top and which is the return?

Mr. CYPHERS: The top is flat and the bottom is return.

A MEMBER: How high is that top shelf from the floor?

Mr. CYPHERS: Sixteen inches between. I tore down one shelf and made three divisions instead of four.

Mr. RICE: How high will each of those shelves be?

Mr. RICE: They are sixteen inches now; how high will they be?

Mr. CYPHERS: From twenty to twenty-four inches. On a new lamp brooder we made it to go over the top. The top is sixteen inches, and the next is twenty, and the next is twenty-three. The sixteen-inch pipe did not give the older chicks as much air as they should have, before you take them off the shelves.

Mr. BROWN: Isn't there difficulty in getting dead chicks from under the hover in the top shelf?

A.—No, we have a cleaner.

A MEMBER: How deep in?

Mr. CYPHERS: Four feet.

A MEMBER: Is that shelf under the brooder higher than the other shelves?

Mr. CYPHERS: No; the first shelf is sixteen inches up, and the hover is just below the lowest shelf in the brooder.

A MEMBER: Do you think the pipes in the side are better than on the top of the chicks?

Mr. NIX: I think that is immaterial.

A MEMBER: The hen heats them from the top. Don't you think it would be more natural to have them heated from above?

A.—When you get a long brooder I would not care whether the heat came from the top or the side. This pipe on the side increases the circulation of air under the hover; that is one thing in its favor.

Mr. Baldwin: Do you use a riser at the end of your pipe system to increase the circulation. I have seen it recommended. It was said that by putting the pipes like this you get a better circulation. What they meant by a riser was when you get to the end of the brooder house to have the pipes higher. I believe it assists the circulation.

Mr. Cyphers: It depends on the length of the house, and whether you have not rise enough at the ends of the system. I have seven inches in that, and four inches is ample.

Mr. Nix: The heater is very low.

Mr. Cyphers: It is only needed when you have the pipes on a level.

A Member: The first chicks are kept in twelve weeks?

A.—No, six weeks.

Mr. Nix: The chicks are in a long, narrow row, so that they can put their heads out and still have their bodies warm, the same as under the mother. The heat spreads over the top, so that there is not a very great variation between the different parts of the hover. When a circulating air current is employed as in this case the heat distributes itself quite evenly. These various systems of brooding practically cover all the methods of piping there are in general use.

What is most essential in brooder design is to get a uniform temperature and apply the heat from the top, if possible, and to obtain forced ventilation. In a great many brooders ventilation is secured through the curtains. This is accidental ventilation. For example: A brooder is heated with an overhead hot water tank or pipes, with curtains upon one or more sides. All the air the chicks get is what diffuses through the curtain. This system will work fairly well in cold weather, provided the brooder is heated sufficiently warm. If, during the night, the temperature runs down and the chicks crowd, a large number of them will smother. In hot weather these brooders, ventilated in this manner, cannot be used at all. In those brooders which have top heat, forced ventilation is secured by surrounding the lamp chimney flue with a cold air drum that forces the fresh air into the hover constantly. There is another type of the bottom heat brooder, with or without central heating drum, that draws the air from outside and forces a warm current into the hover constantly.

Q.—What advantage is there in the round hover?

A.—Less danger of crowding. I like the round hover for the reason the chicks get more curtain. The chicks naturally want the round hover because it is the nearest approach to the hen. Where you have a square hover they have a tendency to crowd in the corners. Here is a brooder that has the curtain all around, and you have forced ventilation, and the chicks can get out of the sides. One advantage it has in warm weather is that after the chicks are a few days old the curtains may be taken up, the same as the lady does her skirts in muddy weather, and you get absolute fresh air conditions.

There is an impression among many that chicks do not require heat, or at least very little heat, in warm weather. This is a mistake. We have raised chicks in July and August in an open field, without shade, successfully, and we maintained the hover temperature at 105 degrees. Heat is just as essential under the hover in warm weather as at any other time of the year. When a hover is used in a large colony house they could be confined around the hover by a hardware cloth or a board fence until they could become accustomed to going in and out. After three days the fence may be removed and they may be allowed the range of the building, and, in the course of a few days more, may be allowed to run outdoors. It is advisable when using the colony system to use portable runs with the colony houses, and confine them the first few weeks, so that in case of sudden storms they will find their way back and will not require the attention of the attendant.

Mr. Baldwin: Where did you place the thermometer when you got it up to 105 degrees?

A.—It is 4½ inches from the floor. On a line with the chicks the temperature is much lower.

Mr. Baldwin: What would it be down there?

A.—About 85 degrees.

A Member: At what temperature do you recommend to run the Universal Hover?

A.—At 110 degrees in the winter and 105 degrees in the summer. The correct brooding temperature varies with the position of the thermometer and the make of the brooder. While 105 degrees is right for the Universal Hover, it does not mean it is right for any other brooder, and the way to determine the right temperature is by the appearance of the chicks. Watch the chicks under the brooder, and bring the temperature up till they flatten out, and when that temperature is reached it is the correct brooding temperature. You can flatten chicks out with heat; I mean a normal chick. You find in this brooder that it takes a temperature of about 105 degrees to flatten them out. In some it takes 85 degrees, depending upon the position of the thermometer. There is one advantage with the circular hover, and that is the chicks will have their bodies inside and their heads near the curtain The hover is a little cooler around the curtain, the air is fresher, and they will keep their heads there. Another thing in regard to the operating of the hover: You hear the expression that the chicks do not go under the hover; the reason is there is not enough heat. If they do not go under the hover it is because there is not sufficient heat to attract them.

Q.—Is that not due perhaps to their being overheated the first few days and driven out?

A.—As soon as chicks are overheated or chilled you cannot tell anything about the brooder temperature by their appearance, because they are hot a while and cool a while, and in a feverish condition. I think the success of brooding chickens artificially is having the brooding conditions the first few days that are similar to incubating conditions; not that the brooder is constructed like the incubator, but it has to be good enough to hatch eggs in, because in the four days that succeed the exclusion from the shell incubation is not really completed until the yolk is absorbed. The little chick that comes from the shell is very much like an infant; it has a tendency to lay around and sleep, and the nearer you approach the incubator conditions in the brooder at the start the better it will be. The temperature would run from 85 to 90 degrees during this period, on a line with the chicks. Heat is quite beneficial if you do not give too much. That is one reason why I like the regulator on the hover. When the chicks are put under a self-regulating hover I know the heating conditions are all right; I do not need to worry any more about those chicks than if they were eggs in an incubator; while if you have to depend on turning the lamp up and down to control the heat in operating brooders, especially out of doors, where you have extreme temperature variations to contend with, from 30 to 60 degrees in a day, that means that the operator has to be on hand a good part of the time.

A Member: What do you consider the best kind of litter for the brooder?

A.—Cut clover, alfalfa, or straw. In the summer time, when litter is not needed to keep the brooders warm, I use paper. I am lazy, and I do not like to clean the brooder. I take a piece of wrapping paper the size of the brooder and put it on the floor; then once a week I take that paper out and put in fresh.

A MEMBER: You use rather rough paper?

A.—Just the ordinary paper. I often use the newspaper.

MR. GRAHAM: Some wrapping paper we get is very smooth.

A.—If you have chicks that have not been hardened and you put them on smooth paper you get straddle-legged chicks.

Q.—What would be the objection to using ordinary earth?

A.—None at all. I used it in outdoor brooders with earth, and there is nothing better. There is only one difficulty, and if you know that you will have no trouble. In those brooders in which the air comes direct from the inside of the brooder to the lamp the dust that is raised by the scratching chicks will stuff up the gauze in the lamp and cause it to smoke. That is a defect in the brooder and not of the earth, because the earth is a disinfectant and an ideal bedding material.

MR. GRAHAM: Why should we not use earth that is slightly damp? Don't you think the conditions in the ordinary brooder are too dry?

A.—You would think so, reasoning from analogy, but I am not prepared to say whether it is of value or not.

MR. GRAHAM: Wouldn't moisture be any good in the brooder?

A.—That is a subject for future experimental work.

MR. BALDWIN: What do you use, cut clover or hay?

A.—Cut clover is the best material. For winter time, when you cannot get cut clover or hay, barnyard litter is all right, if clean and sweet. Little chicks are very subject to bowel derangement in the cold weather. If barnyard litter is used that contains decayed or mouldy particles it will cause trouble, and for that reason I do not use it.

A MEMBER: Did you have young chickens eating too much chaff?

A.—I know the difficulty with that is giving it to little chicks. I never use anything of that kind, because when I put the chicks in the brooder I want to raise them, and I take no chances.

Q.—Then you would not advise using that?

A.—It depends. Sometimes chicks will do all right on it, but you never know what a bunch of chickens are going to do, especially the first few days. In one of my former talks I brought up this matter. I have seen chicks deliberately eat the bedding, whether it is chaff or sand or material of that kind, and the result was very disastrous; and for that reason I have always used material for bedding which I was sure the chicks would not eat, or if they did eat it it was not injurious—cut straw, clover, or alfalfa.

A MEMBER: No litter with the paper?

A.—I use no litter in the warm weather, and in cold weather I use paper under the litter.

Q.—Would a rough, coarse wrapping paper act something like a blotting paper?

A.—Yes, that would be all right. We often take a piece of burlap and put it in to give them toe-hold with very young chicks.

MR. TEBBS: Do you think there is a tendency after the first ten days to put the lamp out, if it is warm in the day time and light it up again at night?

A.—No; I do not think there is; but when you blow the lamp out you sometimes forget about it, and the chicks get cold. In the early spring it gets cold very suddenly, and if you are not there to light the lamp they get chilled. I do not think it does any good—that is, in the beginning. After they are a few weeks old they will stand any treatment.

A MEMBER: Is it not better to run the temperature along the same degree all day?

A.—I never change the temperature with this type of brooder, running all the time at 105 degrees, and I never change it. Pin up the curtain, and as the chickens develop, open the curtain still higher; it does not require very much oil to heat.

What did you use for grit—sand or mica crystal?

A.—I used mica crystal. I have used oyster shell in a pinch; whether it is beneficial or not I do not know. It did not kill them.

Q.—Does sand kill young chickens?

A.—Fine sand will. I have seen a whole brood killed with it.

Q.—What is your idea about feeding little chickens once a day, just feeding them before they are ready to rest at night and during the day; giving them milk first thing in the morning, and half an apple and a little beef scrap in the afternoon, and giving them grain feed at night, with no grain feed in the day at all?

A.—I do not think the best method has been developed. At the present time there are hundreds of methods that are successful, and a great many that are not. Every one who raises poultry has a different way of feeding.

There is one thing to bear in mind in feeding young chickes, and that is the fact that the ability to select nourishing food from injurious or harmful substances does not develop so quickly in the brooder chick as those that associate with the hen. This instinct does not develop in the brooder chick until it is eight or ten days of age. The time, of course, varies with the strain and breed. The same chicks under a hen will be able to distinguish foods in two or three days. A bulletin describing these experiments has been issued by the Storrs, Conn., Experimental Station. The little chick seems to acquire this ability to know injurious or noxious substances from the hen. When the chick is placed direct from the incubator into the brooder it does not seem to have this ability, and shows a tendency to eat anything at all that it can swallow; it makes no difference what material is set before them—sawdust, chick feed, grit, beef scrap, salt or anything of that kind—they will eat indiscriminately, and, for that reason, I have never placed food before chicks continuously or allowed them to have access to food until they know what food is. Knowledge of this fact makes the matter of feeding little chicks very simple. Green food should not be neglected in the little chick's diet, and it must be provided in some shape or form, even if the chicks are upon a grass range. After May or June the grass becomes too tough for them to eat, and green food must be supplied in some manner. I usually feed very slightly at the beginning some commercial chick food or dry toasted bread that gives the nearest approach to zweiback.

Q.—What is zweiback?

A.—Twice baked bread or ordinary toasted bread. It is a preparation used for dyspeptics. At the start, with little chicks, it is desirable to put no strain upon the digestive organs, although later on stronger food should be used. They only acquire the ability to digest by giving the digestive organs something to do. At first feed carefully three or four times a day, keeping them growing, using care not to overfeed.

The way I discovered this selective food instinct in young chicks was by the use of chick grit. I usually put 5 per cent. of grit in the chick feed; the chicks would eat this grit the same as the food until about the eighth or ninth day, and after that time they would eat the grains and leave the grit. When that period is reached you can safely feed both grit and grain and scrap from the hopper, if you so choose.

A Member: Do you ever hear of insurance companies objecting to people running an incubator in the dwelling house?

A.—There is not an insurance company in the United States that will insure a building with an incubator.

Mr. Rice: Except some of the co-operative companies.

Mr. Graham: Last spring I had a little experience. I was running an incubator in the cellar under my house, and I was talking to the insurance agent, who said I would have to pay one-half more rate.

Mr. Nix: I have been running incubators for twenty-five years, and I have never had but one incubator in that time catch fire; but I do not operate incubators in my dwelling with the oil lamp. I have the incubator in the cellar now, but I have a gas connection.

Mr. Elford: If you had a brooder house 75 to 100 feet long and 16 feet wide, with cement floors and no internal fixture, how would you rig it up?

A.—I would want to know the time of the year to run it

Mr. Elford: About March.

Mr. Nix: I would recommend the use of individual lamp brooders, with wall coil and hot water heater, so that you could bring the temperature up in cold weather to 60 or 65 degrees in the brooder house, using individual lamp brooders to hover the chicks.

Mr. Elford: How do you like the cement floor?

A.—I think it is all right. It is something easy to clean and does not harbor lice or rats. There is this about the cement floor, you cannot allow the chickens to get in contact with it in cold weather; you should cover it with litter or straw.

Mr. Elford: How about a board floor?

A.—The trouble with a board floor is that if you get rats under the floor it is difficult to get rid of them.

Q.—How about the effect on the young chickens themselves?

A.—I do not think a board floor would be objectionable.

A Member: Does not a cold floor cause leg weakness?

A.—I do not think so, if you have straw on it so that they cannot come in contact with the cement. You can get leg weakness from a very warm floor, but I would say the difficulty in winter is more apt to be in the feed, the method of overcoming that difficulty would be by changing the diet; add green food. In this case proper temperature conditions are assumed.

A Member: Can you run these brooders with gas?

A.—Yes. A plant we have just fitted up in New Jersey has seventy-two of these brooders and operates them with gas, using an ordinary Argand gas burner.

A Member: Is it a mantel burner?

A.—No, it is one of the oldest gas burners. It has a straight chimney, circular flame and adjusting valve in the burner. Use a mica chimney with this burner.

A Member: They do not have any mantels?

A.—No. The air comes up through the center of the burner. This burner was designed for a reading lamp. I have seen that burner for over twenty-five years; it has been on the market ever since I can remember.

Q.—Do you have a pressure regulator attached to them for incubator purposes?

A.—For an incubator use, if the city pressure varies, you should use a low pressure regulator as protection. You can get them at from $4.50 to $5. A first-class low pressure regulator would cost about $9, and one regulator will answer for all the machines in use.

Mr. **Baldwin**: Have you seen anyone using acetylene gas?

A.—No, I have not. The only objection to acetylene gas is that the fumes from acetylene gas are very noxious, and injurious to animal life. I asked an acetylene expert in regard to the question whether it was advisable to use it in a brooder, and he said we would run a great risk in using acetylene gas for that purpose. You can attach that burner to 1905 Prairie State.

A **Member**: How much are those burners?

A.—The burners alone cost us about $3.50 a dozen, wholesale. Retail they cost more. The list price is $6 a dozen in the supply catalogues, with various discounts. They cost about a dollar retail, including the chimney, cock and burner—that means the whole thing complete to attach to the gas pipe.

Mr. **Rice**: What about that question of anaemia in chicks?

A.—Broadly, it means that the chick is low in vitality or has not reached full development, which is very common with winter chicks or chicks raised in confinement.

Mr. **Graham**: As you travel around the country, what percentage of chicks you see are anaemic?

A.—I would say, outside of a little bunch I saw in the corn field at the Guelph Station last August, 100 per cent. of them were afflicted with anaemia, more or less.

Mr. **Graham**: What is the cause?

A.—Any condition or surrounding that draws on the vital forces reducing the resisting power of the bird. Anaemia shows microscopically or chemically in the blood, and outwardly in the general appearance of the bird. This is a pathological condition with impoverished blood and deficient nutrition. Bad feeding, improper incubating and brooder conditions, poor housing, and insufficient or filthy runs—these conditions will all produce it; in fact, anything at all that will lower the vitality. For example, give a hen good eggs and the chicks which are hatched are of normal size, but with the same eggs put in some incubators the vitality will be slightly impaired, from the fact that the incubator does not reproduce all the conditions we find in nature. I have observed in my work this season that this matter of humidity has a great deal to do in the incubator in producing an anaemic chick. The greater degree of dryness present the greater the degree of evaporation of the egg. It becomes abnormal, and you get what we call an anaemic chick. Another way of producing an anaemic chick is with an incubator in which the ventilation is impaired; perhaps there is enough oxygen to keep the germ alive, but not enough for complete development. The embryo is retarded, and you get an anaemic chick. Anaemia shows in the appearance of the bird, the down is short and it has a small, thin, canary leg, and has a general broken-down appearance.

Mr. **Baldwin**: Have you made blood tests?

A.—It is a theory. I would rather talk to you on this subject next year, because at the present time we are going into the determination to see whether that is so or not. I do not know positively whether that is anaemia or not, but that is what it is called. If you take anaemic chicks where the conditions have been wrong in incubation, and you put them in a brooder, the chances are you will lose them. The same chicks, if not too anaemic, placed under a hen, will recover, and in the course of a few weeks will become normal. The best brooder that ever was made will not produce the conditions that we find in nature. The brooder cannot travel around and find tidbits for the little chicks. The motherly, watchful care is missing. It can only furnish heat and air. A good brooder and a careful operator, when the round-up comes, will surpass the hen in general average. If you do not have sufficient ventilation in the brooder you get this same condition, and if the chicks do not die, they do poorly. You have seen those chickens with long heads and tail, pale face and dull eyes, and some do not grow any feathers. Improper feeding will also cause it. Closed tight brooders will do it even if the hover is all right. There are but few brooders that fulfill the conditions of successful rearing. Any practical brooder should be so made that the entire side can be opened to the outside air. A close brooder will almost invariably produce anaemia. Due care should be taken to secure fresh ground for runs. If you have a run in which the chickens travel over continuously, anaemia will develop from soil contamination. What this is I do not know. I do not think it is the bacteria, simply because you take this same chick and put them on virgin soil and a proper diet they will recover in a short time.

A Member: What is the cause of the excessive formation of a glutinous substance around the chicks in the egg before it hatches?

A.—I attribute that to improper development, the slowing up of the vital forces. The incubator brings the chick along apparently all right till when the period of exclusion comes. The time of exclusion is the critical time in the chick's life. If its vitality has been lowered during incubation you will find a thickening of the membranes, due to incomplete assimilation of the contents. The appearance of the unhatched chicks is what caused the belief of too much moisture. These chicks are wet, and the yolk is not absorbed, and the natural conclusion was that these eggs have too much moisture, and so the incubator was run dry the next time. The season was advancing, the eggs were stronger, and perhaps a better hatch was secured, and the next still better, and so we attribute it to the fact that the eggs were run dryer. I have come to the conclusion that moisture has very little to do with getting chicks out of the shells. There is not a vast amount of difference whether machines are operated wet or dry.

A Member: Can you tell by breaking the egg whether there was too much moisture or too little moisture used?

A.—I used to think so, but I do not now. The way I settled my mind in regard to this was, I set three incubators exactly under the same conditions, one dry, one with a moderate amount of moisture, and one with all I could give it, and I shuffled the eggs, and operated them myself, and was careful with them, and when the hatch was over there was less than one-half of 1 per cent. difference in the result, and to my mind I was satisfied that moisture had little or nothing to do with the exclusion of the chicks. I know there are a great many present who believe they can get better hatches along towards the latter part of the incubation if they will dip the eggs in hot water, and they use wet clothes and get those chickens out. I have never been able to do so.

Q.—Was there there any difference in those chickens in the mortality?

A.—I did not follow that out.

Mr. Baldwin: Was there any marked difference in the chickens as you took them from the incubator?

A.—There was.

Mr. Baldwin: In what way?

A.—To look at them there was a difference in the appearance and size, yet when you came to weigh them there is not very much difference in the weight. Where you get the maximum development you get the long down. I cannot explain that, but hen-hatched chickens have longer down than the chicken hatched in a dry incubator.

Mr. **Graham**: For the benefit of those who are here, there is a photograph downstairs of the wet and dry chickens, and you can see that the down on the wet chickens is longer than that on the dry.

Mr. **Tebbs**: What was your experience? Was it that those with the wet machines had the longer down?

A.—Yes; I think you will find that the chickens hatched in the wet machines have a better development, better blood and lymphatic circulation. They have better development all through, and the yolk is absorbed more quickly.

Mr. **Baldwin**: Did you think that the drier chicks have longer down afterwards? Do you think there is any machine that will hatch as many eggs as a hen will?

A.—No; I do not know. That is a matter of opinion. We have the result on these two sheets here. You can see the difference of a hen hatched egg and an incubator. I was here a few months ago, and saw how careful they were in making that record; they are not interested in any make of incubators. You will find the same results were obtained by Prof. Brown at Theale Reading, England. The figures are given in the annual report. The hens did better work on the average than the incubators by 10 per cent.

Mr. **Baldwin**: You insert the moisture by keeping sand in the pans and you keep them wet. What benefit is in using the sand?

A.—The use of the sand increases the evaporation.

Mr. **Graham**: I think it keeps the water from going bad. When you use a pan of water in it, it will get dry very suddenly. Using water in an incubator it goes dry quickly. Where you have the sand, even when the water is exhausted, the sand will not dry out at least for the next twenty-four hours.

Q.—The spilling, too?

A.—Yes, I used long pans, and was not troubled with its spilling.

Mr. **Tebbs**: Is there any advantage in using cotton wool instead of sand in the tray, apart from the advantage of weight?

A.—I do not see anything to be gained.

Mr. **Tebbs**: I mean in the tray. Instead of the sand put the moisture on the cotton wool.

A **Member**: You mean wet wools?

A.—Yes.

Mr. **Nix**: I have never used it. I have used linen cloths in one incubator. I did not want to use sand, so used a water tray, with an ordinary towel suspended, so that the ends would dip down into the water. The object in doing this was to get various degrees of moisture by using more or less cloth, thus control the evaporation under the eggs. I have hatched the finest chickens on the wet sand, and have never been able, with free ventilation, to drown the eggs in the shell with moisture.

ARTIFICIAL BROODING.

By C. A. Cyphers, Buffalo, N.Y.

I think the best thing I can do is to tell you something about our brooding methods at the Model Farm at East Aurora, of the brooders we have there, and how we operate at the present time. We have four brooding methods at the Model Farm, three of which we will work the whole year around, and the other one in the summer time only.

The one that comes nearest to the hot-house method is a long brooder four tiers high, heated with hot water pipes. We find we have to handle the chicks in this brooder entirely different from the other systems. Operators will need to keep in mind that no two brooding systems are likely to demand the same care. In other words, chickens cannot be housed under two or three distinct systems just alike.

In our nursery shelf brooder the shelves are eight feet wide and divided in the middle. On either side of the middle partition the hovers have been placed. The chicks are placed on the top shelf first, where the pens are divided into spaces 2x4 feet, and a wire screen keeps the chicks within eighteen inches of the hover for first three or four days. The hover has a temperature of 95 to 100 degrees. This temperature is the only principle common to all the brooders, whether we are running the indoor brooders, shelf brooders, or the old pipe system. The hover temperature is always kept at 95 to 100 for the first week. When the chick is first hatched the circulation is very weak, and it has little power of resistance, especially if the bird has not been well ripened in the incubator. If it is kept warm for another week the yolk will have entirely disappeared, and the chick will begin to make good growth, while if it was not kept at a high temperature for the first week it would surely die. In all brooding systems, and regardless of whether the chicks are well incubated or not, if the baby chick gets chilled during the first two weeks it is difficult to raise it. In the shelf brooder we leave the birds on the top shelf for the first week, and then lower to the next shelf. Here they remain for a week, when they are lowered to the third shelf, and then a week later to the bottom shelf. On the second shelf the spaces are four feet long, holding 100 chicks. On the third shelf they are twelve feet long, holding 300 chicks. On the fourth shelf, or bottom, they are twenty-four feet long, holding 600 chicks.

Mr. Baldwin: What space is between each tier?

A.—That house has a sixteen-inch space between each tier, and is not high enough. I shall rebuild the brooder in due course of time, probably making it only three tiers high.

The point to be gained in the construction of this brooder was to arrange it so that a man could care for the largest number of chicks. The longest time we now keep them on the shelves is four weeks. After that they do not do well, even when they are given a longer run. If kept on the shelves for six or seven weeks the feathers stand up like porcupine quills, and they are not a good sight to look at. For four weeks they stand up as strong and do as well as under any of our systems, unless it is the colony brooder, which is used later in the season and arranged so that the chicks can get out on the grass by the time they are two weeks old.

For winter work, when the birds in the shelf brooder are four weeks old we put them under our second brooding system. These houses are built twenty-five feet wide and 232 feet long, divided into two sections. The first section is 104 feet, and the second section 128 feet. The first section is kept warmer than the second, and receives the chicks when first taken from the shelf brooders. The house is half dormer top, the windows in the dormer facing east. We get splendid ventilation in this house, as we can open up these half dormer windows and get a circulation without a draught on the chicks. We never have any strong odor in this house at any time. The hovers are placed in the middle of the house, and are heated by a hot water system. Here the chicks continue to do well, and, in fact, we have put chickens under this system that were left on the shelves too long during our experimental work, and in two or three weeks they would begin to brighten up, their feathers would smooth down, and they would begin to look like chickens again.

Mr. **Baldwin**: What is the width of each pen in that brooder house?

A.—Eight-foot pens.

Mr. **Baldwin**: What system of piping have you?

A.—Hot water pipes.

Mr. **Baldwin**: How are they placed?

A.—They are placed beneath a three-foot walk in the middle of the house. The pipes that heat the hover in the nursery or 104-foot section consist of eight 1¼-inch pipes, divided into four flows and four returns. On one side of the hover, on a level with the top, is a three-inch flow, which supplies the heating coil under the hovers in the second section of the house, and the return comes back through a three-inch pipe placed on the opposite side of the hover, on a level with its top. The coil in the second section of the house is made up the same as that in the first section, but is supplied from a different heater. The three-inch flow and return pipes on either side of the hover are exposed to the general atmosphere of the room, are not covered over in any manner, and therefore help to keep up the general temperature, making the first section warmer than the second, which only has the hover heat.

Mr. **Baldwin**: What do you use for the hover?

A.—A plain board hover made with matched boards battened together, over which the attendant walks. On the edges is tacked a strip of enameled cloth, such as is used in cheap carriage tops. This comes within three inches of the floor, and forms the sides.

Mr. **Baldwin**: What is the space between the pipes and the floor?

A.—Twelve inches. This is higher than we would use for baby chicks when brooding entirely under a pipe system, but in this house the birds are four weeks old before they are put into it. It is what we call a second brooder.

Mr. **Baldwin**: What is the temperature of the room?

A.—In the nursery end the general temperature of the room is 65 to 70 degrees; in the second section about 60 degrees. The hover has a temperature of 80 to 85 degrees.

Mr. **Baldwin**: What system of ventilation have you to keep the air fresh?

A.—The side windows and top dormer windows. I have never found any system to work satisfactorily excepting the windows. These are full windows, placed eight feet apart on both the east and west sides. The top half is hinged and arranged to swing out. The dormer windows are half windows, and are hinged to swing out at the bottom.

Mr. **Baldwin**: On a cold day, in order to keep your temperature up to 70, have you to keep the windows shut?

A.—No; the regulator keeps the temperature right, and we open the windows part way to get the necessary amount of ventilation to keep the air sweet.

Mr. **Baldwin**: No matter what the temperature comes to?

A.—The regulator takes care of that.

Mr. **Baldwin**: Will it close your windows?

A.—No, the regulator turns on more heat; that is, it opens the draught on the heater, which causes the water to flow through the heating pipes at a higher temperature. When the temperature gets up to the desired point the regulator acts and closes the draught on the heater. The draughts remain closed until the temperature goes down a fraction of a degree, when the draught is turned on again. It works automatically.

We have another house that has just been put up and filled. That house is sixteen feet wide and ninety feet long. I put it up to show visitors how they could arrange a small plant. This house contains eight of the Model Double Indoor Brooders. We get very good results in this house. The house is faced east. There is a twelve light 8x10 sash every five feet in the front or east side, and a similar sash every ten feet on the west side. The hallway or walk is on the west side, occupying about three feet of the space. The pens are divided into 5x12-foot sections, and the brooders arranged along the walk so that each half of the brooder is in a separate pen.

Mr. BALDWIN: The building runs north and south?

A.—Yes, I put all my brooders up that way.

Mr. BALDWIN: What is the advantage of having them north and south?

A.—It does not get so warm. With a house facing south one cannot control the heat during a warm day. We face it east and west and put the windows on both sides. The top half of the sash is hinged so as to swing out, and we can open the window slightly on either side and ventilate the building perfectly.

The general temperature of this house is kept up by two ordinary coal stoves. Instead of putting in an expensive hot water system we keep up the general temperature of this house with two ordinary coal stoves. We bought two second-hand parlor stoves of the sheet iron type, which cost us $10 each. We allowed a pen or a five-foot section for each of these stoves, and placed them in the fifth pen from either end.

We put in eighty birds on either side of the brooder, or 1,280 birds in the eight brooders. We keep the hover temperature in the brooder at 95 to 100 for the first week, and it is about 80 degrees on the floor in the nursery in front of the hover. The birds are kept in the brooder for five to six days, and after that they are let out in a small space 2x3 feet in front of the brooder, and kept confined there for a day or two, when we take the partition out and let them have the run of the 5x12 pen. Our object is to keep them confined near the heat until they learn to run in and out freely, and learn to go to the warmth when chilly. When we first let them out the man goes along and sees that they do not stay out too long.

The brooder I like the best for a capacity of about 5,000 birds is the combination house of shelf brooders heated with lamps and the hot water piping system. For fifty feet this house was built double. This portion of it is higher than the balance of the house, and has a half dormer top. On the west side there is a blank wall, with the exception of five half windows placed near the top plate. Against this blank wall we have a three-tier-high shelf brooder. We put the birds on the top shelf for a week, where fifty birds have a space 4x5 feet. They are then lowered to the second shelf, where 100 birds have a space 4x10 feet. The birds have the same space for the third week on the bottom shelf.

In front of the fifty-foot section, and extending on down through a sixteen-foot house is a 170-foot hot water system. This hover coil is made up of four flows and four returns of $1\frac{1}{2}$-inch pipe. To keep the general temperature up in the house we use another coil, placed along the walk, made up of two flows and two returns. This only extends for 100 feet of the house. As it extends through the fifty-foot section, where the shelf brooders are, it keeps that end of the house warmest. After the birds are on the shelves for three weeks they are placed down on the floor under this pipe system, and are worked up toward the far end of the house from week to week on the days we clean. For a house of 5,000 capacity I do not believe there is a more efficient house put up, or one in which the work can be done quicker and easier.

Mr. ELFORD: What kind of floors do you use in your brooder house?

A.—Board floors.

Q.—Is the cement floor bad for chickens?

A.—The cement floor is rather cold for baby chicks.

Q.—Would it be all right with a board floor on top of it?

A.—That would be double expense. There would be no other objection.

Mr. BALDWIN: What about rats under the board floor?

A.—In putting in the board floor we do not leave the rats any place to stand on to gnaw, and we do not have much difficulty. We try to keep them off the place.

Q.—How long have you been on that place?

A.—Only since April, but on the place at Wayland we kept them off pretty well.

Mr. BALDWIN: How do you keep them off?

A.—A rat terrier is a pretty good assistant. We use commercial sulphate of hydrogen, putting a little of it in their holes, and letting the dog kill them when they come out.

Q.—How high is your board floor from the ground?

A.—From eight inches to a foot. It depends on the contour of the land.

A MEMBER: You cannot let a dog under the floor?

A.—Not very well. We put hemlock boards for eighteen inches in the ground around the sides, and they do not gnaw through that very much. In putting in the floor we are careful to arrange the joists so that the rats have nothing to stand on in order to gnaw through the floor, so that if they do get under the floor they do not get in the house.

Q.—Do you have any cases of white diarrhoea in the double brooder?

A.—No, we have practically none at all. We are careful not to let the chicks get chilled.

Mr. ELFORD: Is that individual brooder house of yours as good for rearing chicks for the first month, say, as the outdoor brooder?

A.—There is very little difference. They come as near to the outdoor brooder system as anything we have. At the time of year we could use outdoor brooders the chicks are out on the ground as early as they would be in the outdoor brooders.

A MEMBER: How long do you advise keeping chicks in that double indoor brooder of yours?

A.—We keep the chicks in the brooder for five or six days. Then we let them out in a limited area for two or three days more, and then give them the run of the 5x12 pen. When using this house in the spring we let them out on the ground after they are two weeks old

Q.—Do they go off their feet?

A.—We have very little trouble with leg weakness, although it occasionally shows in winter work.

Mr. BALDWIN: Have you any objection to earth floors?

A.—It is largely a question of labor. Through New Jersey, where they have plenty of sand, earth floors are used almost entirely. They clean twice a year, carrying out all the old sand, and bring in fresh, using it five or six inches deep. They rake it over from time to time with a fine-tooth rake, and have very good results

Q.—What do you keep on the board floor?

A.—Cut clover for the little chicks.

Q.—During the winter they have no access to the ground whatever?

A.—No, not until the weather breaks in the spring.

Mr. ELFORD: What runway did you say you had inside the brooder house for 160 chicks?

A.—There would not be 160 chicks together. The brooder is divided in the middle, and eighty chicks placed on either side, and each eighty chicks have a run 5x12 feet.

Mr. ELFORD: A four-foot passage at the back?

A.—About three feet two inches. We make the building sixteen feet wide over all.

A MEMBER: Is there any advantage in the shelf brooder besides the economy in space?

A.—That is the principal economy. Still, when we get this shelf brooder worked out to a satisfactory finish I expect to make it possible for one man to care for twice as many chicks as under the other systems.

A MEMBER: What depth of cut clover do you keep on the floor?

A.—Not over an inch.

Q.—Do you keep a full inch of cut clover?

A.—I would not say that, but in bedding down we scatter the cut clover in until the floor is thoroughly covered. In the winter time, when we have to keep them in the house for a long period, we bed a little heavier than we do in summer. The dry cracked feed is thrown in the litter, and the chicks made to work for it. After the weather permits the chicks getting out on the ground we hopper-feed more and bed lighter.

Mr. TEBBS: In districts where it is almost impossible to obtain cut clover what do you advise?

A.—Cut hay is the next preference; cut straw the next.

A MEMBER: What would you advise for the prevention of drooped wings?

A.—Scattering the feed in the litter so as to make them work more. More fresh air. With Leghorns the wings grow very rapidly, and we sometimes clip them.

Q.—What feed do you start the birds on?

A.—On grit. We generally take the hatch out of the machine in the afternoon of the day it cleans up, and when we put the chicks in the brooder we give them a dish of grit and a dish of water. This is all they get until the next morning.

Q.—How soon do you give them beef scrap, and do you feed in the litter from the first day?

A.—Yes, we scatter cracked grain feed in the litter practically from the first. In feeding beef scrap, that is put in a dish or a hopper. In winter we usually give them a feed of it in a dish once a day.

Q.—Do you think beef scrap will put them off their feet?

A.—No, not if too much is not given and they have enough fresh air. It is largely a question of fresh air and exercise with it. Breeders have the most difficulty with leg weakness in the winter time. They do not give them enough fresh air. We try to keep the air in our brooder houses as sweet as it is in a living room. That fresh air with ample warmth is the chief feature in raising chickens is my experience.

Q.—Why do you prefer cut clover?

A.—When we bed with cut clover the chicks eat the leaves, the blooms, and the seed, and do well on it. Clover has a tonic or medicinal property outside of its food value.

Q.—How do you operate the colony brooder?

A.—This brooder is divided into two compartments, the nursery and scratching room. The hover is in the nursery. We put in from 80 to 100 chickens. They are kept in the nursery end for six to seven days, even during warm weather. If the weather is warm we open the door a trifle. We would rather open the door than turn the heating lamp out entirely. We keep them in the nursery for six or seven days, until they get well started, and then let them out in the exercising end of the brooder. After they are let out in the exercising part of the brooder we open the glass door a trifle, so as to give them more and more fresh air, and by the time they are two weeks old we let them out on the ground. We use a small shelter with the brooder, which is 3x6 feet, and we keep them confined to that shelter for ten days to two weeks longer, so that the birds are practically a month old before they get out on a larger run. On the run we put four to six brooders in one yard, placing them about fifteen feet apart. Around these we put a two-foot fence. This is to keep the chicks within bounds, so that if a shower comes up we can get them in the brooders quickly.

In feeding them in the colony brooder we throw the chick food into the litter in the nursery end, and also put in a galvanized iron feed hopper, in which we have beef scrap, chick food, and grit. We feed that way for the two weeks they are confined to the brooder. When they are let out in the chick shelter we feed entirely from the hopper. When they are a month old we give them nothing but cracked corn and beef scrap in the hopper, but begin to feed one mash feed a day. The mash feed pushes them along a little faster, and we get the cockerels to broiler size quickly, and the pullets make good growth. The pullets that are hatched from March until June are mash fed, as well as hopper fed, right up to laying maturity. The pullets hatched in January or February are checked in June by giving a hopper of bran only, and we hold them on this bran diet for a month or six weeks. The bran is fed in a hopper. Along in August we begin to hopper feed again of mixed grains, and by the middle of September we begin to get eggs. The very late-hatched birds we crowd with mash feed, so as to get them laying by December. Our March and April-hatched birds come into laying maturity as a rule in October.

Mr. BALDWIN: There is a general impression here that pipe brooders have been a complete failure. What is your criticism about the installation of pipe brooders?

A.—It is in the installation. It is rather difficult to arrange a pipe heating system so that the chicks get enough ventilation under the hover, and at the same time have a hover temperature of 95 to 100 degrees.

Q.—How can you secure the necessary ventilation under the hover?

A.—In the Model brooder we have a forced ventilation. We can confine the chicks until we give them a secondary incubation and get them well started. While thus confined, the forced ventilation keeps the air around them pure. Under the pipe brooder it is difficult to get a high temperature and at the same time get enough ventilation.

A MEMBER: Do you advise feeding the chicks out of a hopper when they are a week old?

A.—That depends on the conditions. When brooding them so that we are sure of getting them out on the ground by the time they are two weeks old we use the hopper feeding principally after they are a week old. When raising the chicks indoors in the winter they will go off their feet in four to six weeks when hopper fed.

Mr. BALDWIN: Do they go off their feet with the hopper feeding if they are off the board floor?

A.—It makes little difference if they are confined indoors. If they can be gotten out of doors when they are two weeks old they will stand almost any kind of feeding.

A MEMBER: Do you give the chicks all the water they want from the first day?

A.—As a rule, yes.

Mr. ELFORD: How is skim milk for small chickens?

A.—We are feeding some this year. I have not made up my mind that it is a good thing.

Q.—They can get along as well with the water?

A.—They always have in the past.

Mr. BALDWIN: Do you object to the practice of taking a chick that is a little older and placing it among the newly-hatched as an object lesson to the chicks?

A.—I do not think there is any necessity for it. There are always some chicks that are brighter than others, which will begin eating and scratching from the first.

Q.—Have you any trouble with chicks dying by eating sand?

A.—No. I have seen chicks that died that had considerable sand in the crop, but I think it was because of indigestion, and the chicks ate the sand to relieve it.

Q.—Do you feed any vegetable food, or do you depend upon the clover feed from the first?

A.—After the first week we like to give some vegetable, and we do when we have it. We have raised good chicks without any vegetable other than the clover, but at the same time I think some vegetable food a good thing, and I was very much interested in the sprouting machine downstairs. I think there is a great deal of value in some sort of succulent green food.

Mr. BALDWIN: How many times a day do you feed the chickens?

A.—In the indoor brooders we scatter food in the litter three or four times a day. When the chicks can be gotten out of doors we keep feed in the hoppers. After the birds are old enough to get along without heat we put them out in colony houses on grass runs and give them a hopper of cracked corn and beef scrap and a dish of water. This year we shall feed some of the birds on range half wheat and half cracked corn.

Mr. RICE: From what age is that?

A.—That depends on the weather and how soon they can get along without heat. Sometimes it is eight weeks, sometimes twelve.

Q.—Wouldn't skim milk take the place of beef scrap for chickens and be more easily digested?

A.—I presume it would; but there is something I don't like about skim milk, and that is the condition in which it leaves the chick. It is hard to make me believe that a chick is comfortable and doing well when it is stuck up and the down and feathers are plastered close to the body. It also increases the work to feed skim milk.

A MEMBER: Do you think twice a day is enough to feed young chicks?

A.—We always have some feed left in the litter—that is, we do not leave them to eat it out perfectly clean. Whenever we throw it in the litter it causes renewed activity. Otherwise one feeding a day would answer if there is enough thrown in the litter to last them all day.

Mr. BALDWIN: Are you troubled with chicks getting into the habit of pulling each other's legs?

A.—They do to some extent when in close confinement. In the spring we had a lot of White Leghorns in one of the shelf brooders in the experimental room. Some of them weighed as much as a pound and a half, when they finally got restless with the close confinement, and they literally ate the breasts off some of them. They were then about twelve weeks old.

Mr. Baldwin: For a couple of weeks I was badly troubled with them, and then they stopped. I don't know what caused it.

A.—One starts picking at another, and starts a drop of blood, and after they get a taste of the blood they keep picking.

Mr. Tebbs: I have seen them a few days old start at each other.

A Member: Do you feed sweet or sour milk?

A.—We have fed both sweet and sour. We feed sour milk to harden the bones to prevent leg weakness.

A Member: If you were building a small plant, which would you prefer, individual outdoor brooders or individual indoor brooders?

A.—It depends on when you want to get to work. For work up to the middle of March I would use the indoor brooders. After that I would always prefer the colony brooders. The birds do better out on fresh ground and green grass, although the first lot of birds out on the fresh yards do practically as well.

A Member: What would be the trouble with some apparently good, sound ducks in October, well fed with green vegetables and grain, and pastured in an orchard, when in October they began to get off their legs and die.

Mr. Baldwin: Were they very fat?

A.—Not extra fat.

Mr. Cyphers: Did they not get at a dead animal? It would look to me like ptomaine poisoning. When a chick or a duck eats putrid meat it causes ptomaine poisoning. I have seen domestic ducks put on salt marshes eat the snail and little fish that have been left in the sun by the tide. They lose the power of the muscles in the neck and wings, and get what is commonly known as limber neck, which is the direct effect of ptomaine poisoning.

Mr. Graham: We often find that where we shelter the ducks to get them to grow as fast as possible they get off their feet.

A.—They need more fresh air.

Mr. Graham: When we have them outdoors the only way I seem to get at the difficulty is to give them more exercise.

A.—The principal thing is fresh air and cool shade. Under these conditions I have fed a ration that has produced a five-pound duck in seven weeks.

Mr. Graham: That is your Model duck ration?

A.—Yes. The birds would get heavy on their legs, but they would not break down so that they couldn't walk.

Mr. Graham: You wouldn't want to recommend a duck fed in that way as a breeder? Would you not want to grow them slower?

A.—In picking out breeding ducks I like to make three selections. We select good birds from the flock when they are eight weeks old, and forcing up to that time will not hurt them. When they are twelve to fourteen weeks old, and have got their second coat of feathers, but are still soft enough to market as ducklings, we go over them again and pick out the birds for market that have not developed as well as they should. When they are ready for the breeding pens we cull again, taking out the undesirable birds.

Mr. Graham: In the selection of your breeding ducks do you pay any attention to the development of the keel?

A.—Yes, but we get more breast meat on the short, broad duck than on the long one.

Mr. **Graham**: You want a short, broad duck rather than a long, narrow duck?

A.—No; a long, broad duck is the one we get the most money out of. It will weigh the most, and grow the quickest.

Mr. **Graham**: Will a short, broad duck mature more quickly than a long, broad duck?

A.—The smaller the duck the quicker it will mature.

Q.—Which would pay the best, from a commercial standpoint?

A.—There is more money in the big duck. The difference in the maturity is only a matter of a few days, as we can get a five to six-pound duck into market at nine to ten weeks.

Mr. **Graham**: How would it do to cross Indian Runner ducks with Pekin drakes?

A.—I do not want a cross breed of any kind on my place.

Mr. **Graham**: The only duck you use or would advise is the Pekin for market purposes?

A.—At the present time the large Pekin duck is the most profitable one. Still, the market is calling for smaller birds all the time, and the market for the larger specimens, either ducks or roasting chickens, is more limited.

Mr. **Graham**: Do you find that in your market a five-pound chicken is more popular than a six or seven-pound chicken?

A.—The hotels are calling for a four-pound chicken, and to supply this trade I am trying a flock of Rhode Island Reds. In many of the hotels they serve their customer with either half a chicken or half a duck, and they want a four-pound bird for this purpose. If they have a six or seven-pound duck they have to quarter it, and when served to two people at one table it is not always satisfactory.

Q.—Does not that apply to the private trade as well—that a seven-pound chicken is too large for a meal?

A.—The average family wants a five or six-pound bird, and there are many families that are satisfied with a four-pound bird.

Q.—We, as breeders, should endeavor to develop a plump, four-pound chicken?

A.—I would rather grow an eight-pound bird, but it is the question of selling them. The market can be glutted with large birds, but up to the limits of the market, I prefer to grow the heavy bird.

Mr. **Graham**: I wonder if the smaller hens are not the best layers?

A.—As a rule they probably are. Many times a stunted bird is a better layer than one that is well developed, but such a bird should not be used for a breeder. I had one flock of seventy Barred Rocks that were hatched the 28th day of May. They were confined to the brooder longer than they should have been, on account of neighboring cats, and after they were let out were confined to a very small yard. The seventy of them were put into one small colony coop, where they crowded at night. They began to lay early, and laid strong all winter, but they were stunted birds, and were small.

Q.—How much grit do you feed young ducks?

A.—We only give them shell in a hopper.

Q.—Do you give them shell in preference to ordinary mica grit?

A.—Yes. In feeding young ducks we give them a hopper of cracked corn and whole wheat after they are a few days old, and a hopper of shell. The little fellows get hungry between meals. When he gets through with his mash feed his crop is sticking out like a walnut, but inside of two hours he is lean and hungry again, and they burrow and work around in the bedding and worry for something to eat. When they have the hopper of grain they will go to it and pick up a few crumbs, take a drink of water, and go back and pick up a few more kernels, and keep more contented until the next feeding.

Mr. BALDWIN: I wish to thank Mr. Cyphers for his speech. The chief suggestion that struck me was the idea in the pipe system of brooding. Mr. Cyphers practically admits that it is not useful for the baby chicks. It can be made of practical use when the chicks are beyond the age of the nursery. The other idea was that in the pipe brooder house the plan of having the buildings running north and south rather than east and west. We know that there is real difficulty, especially in the middle of the day, that the heat is hard to control in the brooder house, which encourages the young chicks to bunch up outside of the brooder. Having the brooder house running north and south, we have the sun from the east to brighten the chicks in the morning, and shade from the roof in the middle of the day, an they get another touch of sunlight from the west in the afternoon. That is what we should all remember, and is worth practising.

VITALITY IN HATCHING, REARING, AND THE PRODUCTION OF EGGS.

BY J. L. NIX, HOMER CITY, PA.

I have listened with a great deal of interest to President Creelman's remarks in regard to the work of the Ontario Agriculure College. Canada should be proud of the opportunities it gives the young people of the Province of Ontario to fit themselves for their life work. While you may consider this College a local institution, the influence extends beyond the confines of Ontario. Your smallest department, the Poultry Station, is known by breeders and growers of poultry from one end of the country to the other. Hundreds of poultrymen in the United States are watching your poultry work, and the new and improved methods that are being introduced. It has become a clearing house of practical information that has a money value which is difficult to enumerate in dollars and cents. I noticed in President Creelman's remarks the money that was appropriated for dairying—I think it was $45,000; but I do not remember him stating how much was appropriated in the poultry work or how important it is in the Province of Ontario. In the States our poultry industry is worth as much to us as the cattle or dairy industry, and there are thousands of dollars appropriated by the Government to dairying and very little money appropriated to the poultry industry. It may be that we do not realize the importance of this industry. It may be from the fact that no one is sufficiently interested in it: a chicken is so little and insignificant. Yet statistics show that the annual production of poultry and eggs in the United States amounts to over $500,000,000. That does not include what is used in the homes of the producers, only the surplus marketed. If it was all included, it would amount to $600,000,000 or $700,000,000. When you consider that everyone is interested in poultry, more or less, and even with the improved methods and appliances the prices are increasing from year to year, in spite of the developments made to keep up with the demand in the way of artificial production, it should be one of the objects of this meeting to find better and more scientific methods to increase the value of poultry products and do it intelligently. I do not think we realize the value of the work that is being done at this station. You may to-morrow, when you hear Prof. Day, have the opportunity of becoming more familiar with the experimental work. The object of that work is to increase the efficiency of labor in feeding, care, housing of fowls and the improving the methods of hatching and rearing. The scientific side of incubation is being carefully investigated. Artificial incubation is not an exact science. There is much to learn. The first exact work on natural laws in incubation has been done at this Station.

Mr. Graham asked me to talk upon "Vitality in Hatching and Rearing, and the Production of Eggs," with this point in view. In any kind of poultry production the whole matter revolves around vitality. If you have good, strong eggs you can hatch them with almost any appliance. If the eggs are weak the task becomes more difficult. Vitality is like a chain of a great many links, if one of these links is weak, the result which you attain with poultry will be as great as the weakest link. If anything in your method is at fault—feeding, hatching or rearing—your efforts will be futile, and the results will be a disappointment. Any one can take a pencil and a piece of paper and figure a profit in the poultry business, because we know the market price and the cost of production and what our buildings would cost, and, it looks very profitable; but, when we get into it, our figures do not always hold out. Why? Because our chicks die. In some stage of the game there is a faulty link. We have failed to keep up the vitality; the chicks die, and our best efforts may end in loss.

Vitality will be discussed at this Institute in very many different lights. As the subject of feeding has been taken up I will not discuss that to-night, but will merely say that, so far as my observation goes, the dry method of feeding has done more to preserve vitality than the wet method. It seems to be easier to obtain vitality and keep it because the birds are never forced. Any manner of forcing egg production will be at a loss of vitality. I do not know as it is necessary to take up incubation. It is a very essential point in incubation to have eggs of high vitality. To get those eggs, is a matter of housing, feeding or mating or, in other words, the influence of environment has much to do with results.

If you have a strong egg, then try and retain all the vitality you can by the use of those hatching methods that nearest approach nature. Naturally the hen builds her nest on the ground. To obtain one hundred per cent. of vitality, a hen in which the natural instinct is fully developed must be used. We have tried to civilize them, and they have lost a great many natural characteristics, so that but few hens have the hatching instinct fully developed. We find that a good incubator will average as well as the average hen, but when we get to the day when the incubator has the hatching power of the best hen, we will be past many of our present troubles.

We also have the matter of brooding to contend with. So many have failed with the brooder. To retain vitality of the hatched chick we must have a brooder built on correct lines, properly ventilated, and maintaining a uniform and constant temperature. The runs must be cleaned and littered in a certain way.

A hen, if not interfered with, will raise chickens only in the spring or during the natural incubating season, but artificially we raise them out of season in the dead of winter or very early in the spring, when the eggs have a natural tendency to be weak or infertile. A brooder is an inanimate machine; it can only supply heat and keep the chicks comfortable, and the little chicks seem to miss the fostering care of the old hen and the many little tid-bits that they would secure on the open range are missing. Naturally a hen would only have a small flock, nine to fifteen, while we in brooders, for a matter of convenience, attempt to raise them in large flocks, which only increases the difficulties. For this reason, in rearing chicks artificially a great deal more care in feeding is required to raise them successfully and to retain a sufficient vitality so that the chicks will develop normally and rapidly.

Another method of preserving vitality is in proper housing. Prof. Rice is to discuss the housing problem, so I will not say anything on that subject. It has a great deal to do in sustaining the vitality of the breeding stock and consequently the vitality of the young chicks. Closed tight and damp, frosty houses will destroy what little vitality the birds may have.

There are two systems in use in rearing poultry, known as the intensive and extensive systems. The extensive is commonly called the colony system. I have visited hundreds of poultry plants, successful and unsuccessful, and have seen the various systems in practical every day use. More failures have occured upon the intensive plan than any other. They seem to succeed for a year or so and then fail. Upon this plan the birds are crowded so as to save labor in caring for them, with the result that the soil becomes contaminated, the birds become diseased, and the plant is soon a thing of the past; while on those farms where the colony system is used the breeding birds are spread out, the young chicks are on fresh, clean soil, given unlimited range, housed in small flocks and it is rare indeed for a plant of this kind to fail.

Another feature that has worked to the great injury of the poultry industry has been the successful business man who has made thousands of dollars in business and manufacturing or selling. When he sees the difference between the cost of producing poultry and the selling price, he naturally presumes that his superior business training and methods if introduced in the production of poultry upon a large scale, would be a highly profitable undertaking, and the result is that thousands of dollars are lost by men of this kind going into the business without experience or practical knowledge, and the country is full of abandoned poultry plants of this kind. We visited a plant of this kind only a few weeks ago, where an expert railway man had spent $60,000 upon a farm. With a great deal of pride, he showed me his poultry houses. They were well built, lined and ceiled as tight as a drum. There was not a ventilator in the building; no provision had been made for ventilation, and scarcely any for light. The frost was hanging upon the ceiling and walls in long festoons. This was the beginning of another failure, unless the entire plant is radically changed. Many plants are almost a success, and they will eventually succeed.

As an example, there is a Leghorn farm in New Jerey. They have no difficulty in caring for the old birds and producing large numbers of eggs. They sold something like 140,000 eggs for hatching purposes last season, besides what they used themselves. They have had great difficulty in starting their young chicks, and the trouble has been in their system of brooding. The coming season they will use the individual lamp brooder in place of the hot water heater and pipe system and, try again.

One of the successful plants that could be named is the Lakewood Farm at Lakewood, N.J. This plant was fully described by Mr. Hunter at last year's Institute. The Lakewood chicks are started in individual lamp brooders in long brood houses, and are then transferred to colony houses on the open range. Birds are grown upon the open range and brought into the winter laying houses in the fall with a maximum amount of vitality.

We would warn you against attempting to keep up your breeding stock by using eggs from birds that have been forced for winter egg yield. You run great risk in hatching and rearing chicks from these birds on account of the loss in vitality. You might succeed for a few seasons in hatching eggs from hens in confinement, but, eventually, there would be such a loss of stamina that the business would be endangered. Vitality must be kept up from beginning to end. We all agree that the maximum vitality is secured by keeping the breeding birds always on an unlimited range in small flocks. I think there is a reason for this.

The ordinary barn fowl partakes more of the pheasant nature than does any other bird that I could name. They are a ground bird, used to roosting in low shrubbery. Pheasants in the winter time will be found resting in low spruce bows, getting off the ground five or six feet, just out of reach of foxes and in a sheltered place, preferably a narrow ravine where the wind cannot find them. When the barnyard fowl is surrounded by similar fresh air conditions they never seem to suffer from the cold. As long as they have plenty to eat, and are protected from winter storms and rain, they retain their vitality. This shows from the fact that the combs do not freeze, and the eggs from such stock are highly fertilized and very strong.

The permanent colony house is not as good as the portable. The portable house is usually built upon runners similar to the common stone boat. In the spring and summer time they are drawn upon the range, and in the winter time may be brought up near the feed house and arranged in rows, so that it is almost as easy to care for the birds as if they were in a single continuous house. The colony house system is in general use in England, and is practically the only system employed. The colony houses have wheels at each corner. The houses do not have any floors, and are drawn to a fresh plot of ground every few days. I would advise those who contemplate going into the poultry business, no matter on what scale, to start with the colony system. If you wish to use the intensive system, use it afterwards when you get familiar with handling birds on a colony house plan. It takes a little more work, but it is best in the end, and the chances of success are much greater than where the other plans are followed.

A typical colony system is in use upon the Tillingast plant at Vernon, Conn. These houses are fitted with food hoppers and filled once a week. They are only cleaned on the average once a year. The labor cost is reduced to the minimum, and eggs can be produced upon this plant at a cost of 7 to 9 cents a dozen. Upon the intensive egg farm where all feeds are supplied and the birds are confined, the cost of egg production runs from 12 to 16 cents per dozen, while on the ordinary farm where the chickens pick up a large amount of their food, the eggs can be produced for from 4 to 6 cents a dozen. The intensive plant always has to meet this competition, and can only succeed where they have a special market. Any farmer can materially increase his production by the use of a few colony houses with scarcely any increase of labor cost, and the use of an incubator or two and a few brooders will prove highly profitable. The best birds are produced upon the farms where they have practically an unlimited range, and for that reason I would recommend any and all who raise poultry to give the portable colony house careful consideration.

Q.—What about the corn field chickens?

A.—Last August while at Guelph, Mr. Graham took me out into the centre of a thirty-acre corn field where there were some chickens that did not have feathers enough to cover them, they were growing so fast. (Laughter) These were grown under as natural conditions as it is possible for us to get, and at five weeks of age were as large as the usual chicks are at eight or nine weeks of age. Putting little chicks on the grass range is not always best if it is ranged over by larger chicks. The little chicks do best upon virgin soil, ground that has not been ranged over by other birds, and that is where the advantage of the colony system comes in. The only drawback to the colony system is in those locations where they have wild animals; but where there are no foxes or skunks, to carry off the birds there is no better way of raising them than by placing the colony houses along the turn rows or edges of the cultivated fields.

Q.—What size of colony house do you recommend?

A.—For rearing young chicks we like a colony house about 6 x 8 ft. If the colony house is to be used in winter time for layers, 8 x 12 ft. in size would be better.

Raising birds for market and raising breeding stock are entirely different propositions. For breeding stock where you desire to get the fullest development you cannot crowd, while the same birds if intended for market, two or three times as many could be put together.

Q.—Do you prefer the open front house?

Any properly constructed colony house is practically an open front house when the windows and doors are open. The openings in the door and the window should be hinged at the top, opening out from the bottom to keep out the rain during storms. It is very desirable to have the houses so arranged that the attendant will not have to look after them during sudden showers and storms. Colony houses can be constructed after a great many plans and still be practical. Plans are modified to suit the locality and climate or soil.

Q.—What is a good treatment for a chicken until it is about ten days old?

A.—There are a hundred different ways of feeding a chicken that are entirely satisfactory, and there is no one way to feed a little chick. Do not have anything around the chick that it will eat that will injure it. Clover hay and alfalfa make good litter, but I would not use fine sand. Still, I have seen hundreds of them raised on sand, and I have seen chickens eat sand and never get over it.

One thing you should bear in mind, and that is, the first few days you have to be particular to have the temperature right. The chick as it comes from the incubator, while it is out of the shell, is not completely incubated until about four days afterwards, till the yolk is absorbed. You find naturally the hen stays very close to the chick for a few days after it comes from the egg, and it is necessary to have these conditions in a brooder. The runs around the hover should be very small the first few days. They require very little nourishment until the yolk is absorbed. We use bread crumbs, but you should not feed too much.

My method of determining the amount of food the chick should have is by watching the crop. That should not be distended at any time; when too much food is placed before them they will over eat. If the chick is good and strong, it might pull through but the weak ones will succumb. As a general rule you have to use a good deal of precaution the first few days. I commenced to use beef scrap from the very first, but in very small quantities. I used the ordinary chick foods. The standard varieties of chick foods on the market are entirely satisfactory. The great danger in using cheap commercial foods is getting chick feed that contain weed seeds. That is especially true of chick feeds that come from the west. They contain not only weed seeds, but seeds that have become musty, and seeds of that kind will produce disastrous results. You can make a very good chick food of meal and cracked corn, and cracked wheat in equal parts, sifted.

and with it use 10 per cent. of meat scrap and 5 per cent. of grit. The chickens require no more than that, except green food. They must have green food. They cannot eat tough grass. If you put them in a corn field they will find something there that is all right. I do not know whether it is animal life or those soft succulent plants that grow up between the corn, but there is something that has a wonderful effect on the chicks. If you hatch good chicks and feed them properly you ought not to have any difficulty in raising all of them. If you fail, take the Guelph Short Course and learn how.

The CHAIRMAN: We are very pleased indeed to have Mr. Nix give us this talk. There is a great point in the vigor and vitality of our flock, and Mr. Nix has spoken of the ease and ability by which one man can figure out on paper, that which does not work out in practice. I am not quite sure what he means by "intensive system."

Mr. NIX: What I mean by the intensive plan is, where birds are housed in long buildings and confined in closed yards, such as the ordinary commercial plant in the United States. With the colony plan no inclosures are used.

The CHAIRMAN: I think we want to bear in mind that the poultry work is truly best adapted as one of the branches that a man may carry on in connection with farm work.

Mr. Elford is going to speak to us. We have missed him from his general work over the whole Dominion, as part of the Dominion Poultry Department at Ottawa. He is now engaged in that very interesting work that is being carried on in Ste. Anne de Bellevue, where he has charge of the Poultry work. We would like to hear him tell us something about the work there."

POULTRY WORK AT MACDONALD COLLEGE.

BY F. C. ELFORD, STE. ANNE DE BELLEVUE, QUE.

This is the first poultry meeting of any description that I have been at, since I was at one a year ago, so you would think I am pretty rusty. I have not been doing anything at poultry this year; I have been driving dagoes; but I am very glad to get back to poultry again. I do enjoy a good poultry meeting, and I do enjoy working with poultry. As the Chairman says, I have charge of the Poultry department at the Macdonald College. The fact of the matter is, we have not much of a department there yet to have charge of. You all know we are just in our infancy down there. Buildings are being built, and we expect at some time in the near future, probably next year, to have something there that is worth looking at.

I want to say a word of two about the poultry work at Macdonald College. Mr. Nix was telling us something about the colony house system. I want to say that I am glad we are orthodox; we are following Mr. Nix's advice, and have started with colony houses. I might say we did not intend to start with a colony house, but we had to do it, as the buildings are so far behind. I think it has been a good lesson for us, and I think more now of the colony house than I did before. When we are putting up the colony houses, which we only intended to be temporary till we get up our other houses, the people would come from over the country and say, "I suppose this is only temporary?" I would tell them that we did not intend to keep them here all winter, we only expected to keep them till the other houses were ready. They have been in there all winter, and they are likely to be there longer.

I want to tell you just how our poultry are doing in their houses. We have three different sized houses. One size is 14 x 20 with a 6½ foot studding, and a double roof with a straw loft. The other one is 10 x 20, arranged the same way, only it is six inches lower down; that is, the ceiling is six inches lower down. Both of these houses contain fifty hens, so you can figure out the square foot per hen. We are not orthodox there, according to the old rules that poultry men have laid down. We are not giving hens sufficient floor space. We have some smaller houses, 8 x 12 feet, to accomodate twenty five hens. These houses are built very simply. They are built of one ply of board, tongued and grooved, with the exception that at one end, where we have the roosting quarters, we have an extra ply of board. That is all the covering these hens require, and the temperature there goes down considerable lower than it does in Guelph. We have had it there twenty-eight to thirty degrees outside the house, and it has been eighteen below zero for some time. We have had it now at ten degreees below zero for several days at a time.

The fowls that we have in there are all pullets—last year pullets. We have only two hundred and fifty: one hundred Wyandottes, one hundred Barred Rocks, twenty-five Buff Orpingtons, and twenty-five Rhode Island Reds. That is the entire flock we have.

Along about the first of September, after these pullets had been moved around three or four or five times, they started laying, and they have kept it up fairly well until about the middle of December, when they laid a great deal better, and when I left there a week ago, we were getting a hundred eggs a day, sometimes a little less, from two hundred and fifty hens; and although the temperature in those houses went down to eighteen degrees below zero, they have very seldom failed in production of eggs. Probable the third day after an extra cold snap they would go down, may be a dozen, but the chief reason for the falling off of the egg production was on account of one breed—I will not mention the name—but that breed went down when the mild weather came while the other breeds went up.

I do believe we are practising the fresh air treatment with a vengeance. There has not been a day when the doors and windows have not been opened, and I have never yet seen his year a flock of hens that are as healthy as they are. We have not had one sick. We had three or four die, two from being a little too fat; they were not laying. Three also died because they hung themselves in a trap nest.

Just a word or two about what we intend to do. We are trap-nesting all the pullets at the present time. We intend to trap-nest every hen that we have on the place. Our idea is to build up a laying strain, at the same time not to lose the utility or the table properties of the fowl. We intend, of course, to breed from the best every year by the system of selection with the trap-nests, and also from appearances. We want to keep our flock up to a good table appearance, at the same time we want the egg production. I have another reason why I like these colony houses for an institution of this kind. People come out here and talking to Mr. Graham, and, looking at his office and at the general appearance of the buildings, and they take it all in as a whole, and they go home and say "Yes, it is all very good for an Institution with that amount of money, but we cannot put up such buildings as that." Then Mr. Graham will take them to his small house and that is where they will get the lesson. Our idea at Ste. Anne is that when the farmers come to gain information, not to take them only to the large bulidings but to show them the small buildings. We are going to have a splendidly equipped plant, over and above the colony houses; but we want to take the farmers to the colony house and say: "There is a little house that you can put up for very little money: that keeps fifty hens, and it has netted us so much money." That is something they can put into practice, and that is something which appeals to them. We want to be in a position that each boy or each two or three boys, as the case may be, can have one of these colony houses for his very own while he is at the college. He is in charge of that house and he has to pay by check for all the food he gets for the house, and he receives credit for what he gets out of it, and if he does that while he is here he is more likely to do it at home than if he just listened to lectures.

I cannot begin to tell you what Macdonald College is going to do. It is a tobacco man who is building the College, but I do not want you to think that because Sir William MacDonald is building the College that it is going to go up in smoke. It is built of stone and steel and cement, and is a very substantial affair. I am not going to compare it with Macdonald Institute. We take a great many lessons from Guelph, and we want to be men enough to own up that we owe it to Guelph.

SCIENCE IN INCUBATION.

By W. H. Day, O.A.C., Guelph.

I want to say at the outset that I am not a poultry man in the proper acceptation of the term. I think I am becoming one more and more every day. Until last spring I was not closely in touch with the poultry work. I was aware that there were some problems in the poultry industry that required some investigation—some physical problems. If there was one thing that I learned during my course at Toronto University, it was to have a love for investigation, and that has stayed with me. One of the fears I had when I came to this institution was that I might not be able to carry on as many investigations as I would like. That was a false impression, due to my ignorance of the work here. Last spring when Mr. Graham invited me to co-operate with him in the investigation of some of the physical problems lying at the basis of incubation, I was very much delighted, indeed, because it was giving me a chance on investigations which I had learned to love.

It seems to me there are several factors in successful incubation; more perhaps than we have been accustomed to believe heretofore. Until recently, we have looked upon the question of temperature as the leading if not the only factor. It no doubt is important, and I think it has been pretty thoroughly solved. Besides proper temperature, however, evaporation is coming into notice as a factor and evaporation must bring in the question of humidity.

CO_2, by which we mean the carbon dioxide of the air, has been investigated to some extent. You know that the air we have taken in pure and fresh is breathed out impure. The air as we take it in is ready to support life or combustion, but as it is breathed out it is foul, and will not support life, and, moreover, it will not support combustion. Now let me tell you of an experiment that you can all perform for yourselves. Take a little bottle like the one I have here and put a candle in it. Melt a little of the wax and run the wax in the bottom and set the candle in the wax, and light the candle; then take a rubber tube similar to the one I have here, put one end of it down in the bottom of the bottle and breathe into that bottle the air that comes from your lungs; one good long breath or two will extinguish that candle, showing that the air that is exhaled is in a different condition from that which was inhaled. The former will not support combustion—one good long breath will extinguish the candle; but the pure air would keep the candle burning in the bottle all day. Now that power of the exhaled air to extinguish the candle is due to an ingredient known as carbon dioxide, which is breathed out by all animals. The same substance is found in large quantities under the hen. We call it carbon dioxide, because it is composed of carbon and oxygen. The first letter of carbon is C, and the first of oxygen is O, and a substance made of carbon and oxygen in equal volumes is denoted by CO; and since there is twice as much oxygen as carbon in this substance exhaled by animals we call it CO_2. Since it was found to be plentiful under hens we began to wonder if it has not really a function in incubation.

For the past year or two I had been working upon the question of humidity, and evaporation from water, and Mr. Graham invited me to take up the same line in the poultry industry; that is investigate the humidity in incubators. At that time we were of the opinion that humidity, and therefore evaporation, was a controlling factor in incubation, and we came to attack this problem: What is the humidity in incubators? What is the *best* humidity for incubators? What humidity in incubators will give a hatch most nearly approaching the hatch of the hen? That was the problem we had before us when we started. Mr. Baldwin's suggestion as to the explanation of humidity is right in line with what I had intended to do.

I have here three U tubes. In the first one we have some pumice stone, with sulphuric acid. The second tube is connected with the first and in it we have anhydrous copper sulphate, meaning copper sulphate, from which the water of crystallization has been driven off by heat. The third tube is connected to the second, and in this there is calcium chloride which has been fused, and the water driven off, all these substances having a great absorbing power for moisture. Now if I take this water-bottle and lead a rubber tube from it to the third U tube, and open the pinch cock and let the water flow out, that water running out will draw air through the tubes. The substances in the tubes absorb all the water from the air. We can measure in the bottle the amount of air drawn through, and if we have weighed the tubes before the operation and again after, we shall know the amount of moisture that has been taken out of a certain volume of air that has been drawn through. This is the way we determine the amount of moisture in the air at the present moment, called sometimes the absolute humidity. Humidity is derived from the word "humidus," meaning moist.

We have arrived at the absolute amount of moisture in a certain volume of air; now the amount of moisture in the air at the present time is not the greatest amount that the air can hold: that is, the air is not what we say, "saturated." If we were to sprinkle the floors and the walls and the ceiling with water and caulk up all the openings, windows and doors, and let the water evaporate for a little while, we would pretty soon have a saturated atmosphere, that is the air would have in it all the vapour it could hold, and no more water would evaporate. We might leave that water on the floor for months if every opening were stopped up and no more would evaporate after the air was saturated. The saturation moisture at any given temperature is the maximum amount of moisture that the air can hold at that temperature. The saturation pressure varies for different temperatures. At seventy degrees, probably the temperature of this room, if we were to saturate a room 10 feet square and 10 feet high it would just hold 1 pound 2 ounces of water in the air in the form of vapor. A room the sam size at a hundred degrees when saturated would hold 2 pounds 11 ounces of moisture in the air. It seems surprising, but the amounts are correct, and have been established. Those are not our own figures, but are taken from recognized authorities on the work. A room 10 feet square and 10 feet high at 32 degrees, just freezing, would hold only five ounces, so that here is a room 10x10x10 which has a saturation capacity varying with the temperature. It is twice as much at one hundred degrees as it is at seventy degrees and it is more than twice as much at seventy degrees as it is at thirty-two degrees, and so when we say the air is saturated, we have to know the temperature before we know how much moisture is contained in the air.

The "relative humidity," as we call it, is a different thing. Suppose that I take one thousand cubic feet of the air at the present time, and I find out that at seventy degrees one thousand cubic feet contains 8 ounces of water vapor; by this test I want to know what is the humidity of the room. How much did I say that room of one thousand cubic feet would hold at seventy degrees if saturated? It would hold 1 pound 2 ounces or 18 ounces, and now it has only 8 ounces; that is it has only eight-eighteenths of the moisture it is capable of holding; and if we multiply that by one hundred we have it in per cent. That is, the atmosphere in this room has practically 44.4 per cent. as much moisture in it as it has capacity of holding; so that a room 10 feet square at 70 degrees having 8 ounces of water in the one thousand cubic feet has a humidity of 44.4 per cent. The lower the humidity, the greater the absorbing power; so that the humidity is a direct measure of evaporation. That is all we can say at the present time. There are several factors controlling evaporation in general; there are humidity and circulation and temperature controlling evaporation. These three factors have not been separated, so far as I know, and the exact effect of each one determined; that is a problem, a very fruitful one, still to be solved. But the method I have described is not the way you are accustomed to determine the humidity; you use a "wet and dry bulb." Since the wet and dry bulbs are so generally used in determining the humidity, I want to shew how the determination is made by them. If you take a beaker of water and put a flame under it, and a thermometer in the water, and watch the temperature, you will see it rise and rise till the water begins to boil, probably 210 degrees here, and there the temperature of that water will stay although the flame is sending heat into it all the time. Now what is becoming of all the heat that is going into that beaker of water from this flame? It is being used in turning the water into vapor.

Suppose we define a unit of heat to be the heat necessary to raise a pound of water one degree, and then we find out the number of units to raise a pound of water from freezing up to 212 degrees, that would be 180 units. It will take 5.35 times as much to turn that water into vapor without changing the temperature a bit. That is known as the latent heat. It is called latent because we don't see any effect on the temperature. It is not latent at all, it is very powerful and active: it turns the water into vapor. Now, wherever evaporation is taking place that heat has to come from somewhere, to turn that water into vapor. This thermometer reads 67 degrees, and this other one reads 65 degrees. I will put a close fitting linen gauze over the first and dip it into water. The water is cold, but I will heat it with my hand. Now it comes up to 80 degrees, but I take my hand away and watch the temperature; it was up to 80, it is dropping down to 75, and we will let it lie there a moment or two and see how far it will drop down. Of course it will cool down as low as the room temperature, but it continues to go lower. The question is, what is cooling that thermometer below the room temperature? Why, evaporation is taking place from that wet gauze, and there has to be some heat to cause that evaporation, and that heat has to come from the immediate surroundings, the mercury and air that is close to it. The temperature now is 62 degrees and this dry one lying here on the table is still 65 degrees. We will let them lie there a little while longer and we shall see that the wet one still goes considerably lower. I say the drop in the temperature of the wet bulb is determined by the speed at which evaporation is taking place. These two thermometers form a "wet and dry bulb" hygrometer. Here is another form: the thermometers mounted on a frame. They are both the same in principle. Now suppose that we used this wet and dry bulb at the same time that we determined the absolute humidity and the relative humidity by the U tubes. By this method we find out that when we have a certain relative humidity the wet and dry bulb differ by a certain number of degrees, and the results are set down; at another temperature and humidity they differ by another amount, and this result is set down. This method is continued for all temperatures and all humidities, and a complete table of results made. Then when we wish to know the relative humidity we simply take the wet and dry bulb readings, look these up in the table and see the humidity that is set down opposite them. That is the humidity corresponding to those readings.

Now, with that explanation of humidity I am going to show you the work we began last spring upon the subject of humidity in incubators. The first problem was to get a satisfactory form for the wet and dry bulb in incubators, and so we devised a wooden frame to hold and protect the two thermometers in horizontal position. A little bottle of water is lying down beside the wet bulb; that is better than the bottle standing on end, because the wick would have too far to draw the water, but with the bottle lying in this way the wick can draw the water to that wet bulb without much trouble; we can set this frame in the incubator right among the eggs and we can read the humidity from time to time. But there was one troublesome fact, and it was this, that possibly circulation in the incubator was not sufficient to give proper humidity reading.

Those tables that I have shown you here were determined for free diffusion in the air; some of them are correct when the wet and dry bulbs are fanned.

A MEMBER: You said some of them. Are they not all uniform?

MR. DAY: They are uniform, all taken for free diffusion, but they are not all correct for fanning, for this reason: At middle humidity it makes no difference in the air whether you fan a wet and dry bulb or not. That was the first thing we had to determine, so we thought we would get a little motor that would fan this wet and dry bulb in the incubators, and so when we wanted them fanned all we had to do was to turn that button and there we have a current of air passing over the little wet and dry bulb.

With that arrangement we can also fan or not fan the wet and dry bulb in the incubator. In the ordinary air, at middle percentages of humidity, it doesn't matter whether we fan that wet bulb or not. It gives us the same reading, but when the humidity is very low or very high then it seems that the air cannot take the moisture away fast enough, and consequently it makes the wet bulb read a little high compared with this set of tables. If, on the other hand, we fan the wet and dry bulb when the humidity is low or high, that drives the air away, and we will reach a lower humidity by this method.

TABLE I.—HUMIDITY, EVAPORATION, CO_2, AND HATCH OF INCUBATORS.

Incubator.	When Set.	How Run.	Humidity of Room.	Humidity of Incubator.		Per cent. Evaporation from Eggs.	CO_2 in 10,000 Parts.	Per Cent. Hatched.	
				With Fanning.	Without Fanning.			Of Fertile Eggs.	Of Total Set.
Chatham 5	June 25	Dry fanned during day	62.9	40.5	....	11.0			
	July 20	" "	66.2	38.5	....	12.5	8.9(3)	61.5 (selected)	53.3 (selected)
	Aug. 20	Moisture in bottom	51.8	62.4	76.1	11.1	....	85.7 (selected) 76.3 (shuffled)	80.0 (selected) 61.0 (shuffled)
Chatham 6	June 25	Dry	62.9	37.4	....	9.1			
"	July 18	"	62.3	41.0	47.2(7)	14.6	8.1(2)		
"	Aug. 12	"	68.1	40.7	51.2(8)	14.8	6.5(3)	78.6 (selected) 65.0 (shuffled)	73.0 (selected) 47.0 (shuffled)
—Chatham	July 20	Dry	66.2	34.6	....	15.8	9.3(3)	....	
Chatham 4	July 20	Dry	66.2	37.3	51.0	14.6	7.8(2)	....	
"	Aug. 20	Moisture on top	51.8	60.3	71.7	14.0	....	71.4 (selected) 71.0 (shuffled	66.7 (selected) 57.0 (shuffled)
New Prairie State	Aug. 7	Moisture in bottom	69.3	58.9(3)	76.6	9.2	3.3(no eggs) 7.3(10)	72.0 (selected) 68.0 (shuffled)	53.0 (selected) 50.0 (shuffled)
"	Sept.	" "	....	....	....	9.1	7.3(9)	65.4 (selected) 70.0 (shuffled)	56.6 (selected) 61.0 (shuffled)
Old Prairie State	July 17	Dry	62.3	33.9	....	15.8	6.7(2)	....	....
"	Aug. 12	"	68.1	33.0	42.3(12)	15.3	5.6(3)	69.0 (selected) 65.0 (shuffled)	60.0 (selected) 45.7 (shuffled)
Cyphers, Chas. A.	July 17	Dry	62.3	35.9	44.8(6)	16.6			
Model	Aug. 12	"	68.1	37.4	50.4(12)	16.7	5.4(4)	78.0 (selected) 70.0 (shuffled)	68.0 (selected) 48.0 (shuffled)
Dry Machines	Averages		65.1	39.0	47.6	14.6	7.3	71.8 (selected) 66.7 (shuffled)	63.6 (selected) 46.9 (shuffled)
Wet Machines	Averages		57.6	60.5	74.8	11.4		73.6 (selected) 71.3 (shuffled)	64.1 (selected) 57.3 (shuffled)
Chatham 2							3.2 (no eggs)		
Front Room							3.3		
Incubator Room							4.6, hen's level		
" "							2.8, machine level		

These two sets of tables are made up a little different. This one, the Dominion tables, seems to be made for fanning, but this other appears to be made up as nearly as I can tell without fanning, or at least with very little except a free diffusion. This is a set of dry and wet bulb tables by James Glaisher, published by Taylor and Francis, of London.

The CHAIRMAN: Is there any great variation between them?

A.—Considerable. We have used the Dominion tables entirely.

As soon as we found out that at low humidity there was a difference between the wet and dry bulb from fanning and not fanning, we decided to use the fan in the incubators, and we set it up in all the incubators, and we read the humidity in them from time to time.

I have here the humidity of incubators with fanning and without fanning. If you notice there is Chatham 5; here were two of the highest in humidity of 40.5 and 38.5, the humidity of the air during that time being 62.9 and 66.2. Another test was made with Chatham 5, in which we put moisture, and the humidity was very much higher.

The CHAIRMAN: The relative humidity of the room was nearly the same in the two cases. How do you account for the difference in humidity in the incubators?

Mr. DAY: I cannot explain except on the assumption that the incubators were a little different in the two instances.

The CHAIRMAN: The incubator was different in the two readings?

Mr. DAY: They were apparently the same. These are the average of all the humidities during the period of incubation. And so if there was a little error in one of the readings it would not vitiate the results to that extent. I can only explain that anomaly on the assumtion that one of the incubators that were apparently treated the same must have had a door a little looser than the other or something of that nature. A loose door reduces the humidity materially. Chatham 6: First hatch, humidity, with fanning, 37.4; second hatch, with fanning, 41.0; without fanning, 47.2; third hatch, with fanning, 40.7; without fanning, 51.2. Blank Chatham, 34.6, with fanning. Chatham 4: First hatch, dry, 37.3, with fanning, and 51.0 without fanning. Chatham 4: Second hatch, moisture on top, humidity 60.3, with fanning, and 71.7 without fanning. Note the great increase in humidity, due to the moisture on top. The New Prairie State, with fanning, 58.9 (3); without fanning, 76.6; old Prairie State. 33.9, with fanning; second hatch, with fanning, 33; without fanning, 42.3. Cyphers, with fanning, 35.9; without fanning, 44.8. The Model, with fanning, 37.4; without fanning, 50.4. Dry machines, humidity of room, 65.1; machines with fanning, 39.0; without fanning, 47.6. Wet machines, humidity of room, 57.6; machines with fanning, 60.5; without fanning, 74.8. Practically a difference of 50 per cent. between wet and dry machines, the humidity in the wet machines being 50 per cent. greater than the humidity in the dry machines. Those were the humidities in incubators—the averages of our whole summer's readings on humidity—and right here I would like to pay a compliment to one of our students for the way he followed this up; I refer to Mr. McKenney.

We had not been working on humidity very long when I said: "We must have some way of getting at the humidity under a hen." And after a day of thinking I devised what I have here, a nest hygrometer, (see Fig. 1), and I believe I exhibit to you the first nest hygrometer that has ever been used. It consists of two disks in the centre, each disk being of the same diameter as an egg, and the disks are perforated, the little holes allowing the air to circulate all through. Outside the disks is a little covering of strainer gauze—brass gauze. The disks are used to keep the gauze in a rigid form,

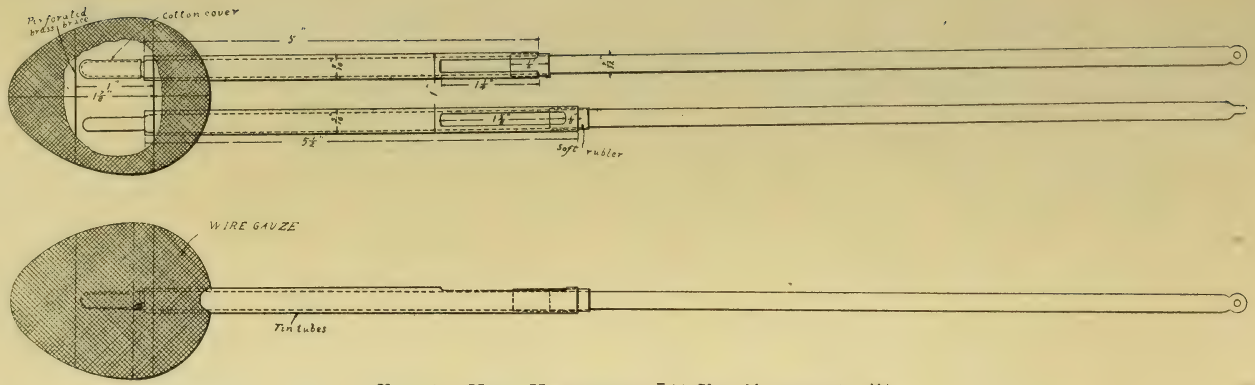

Fig. 1.—Nest Hygrometer ("Egg Hygrometer").
Wet and Dry Bulb Thermometers in Egg of Wire Gauze. Thermometers are 15 inches long.

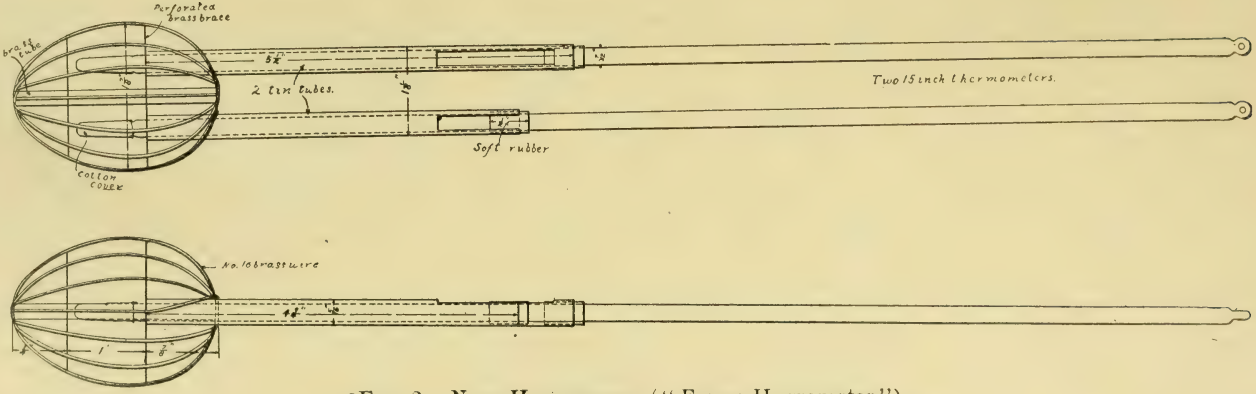

Fig. 2.—Nest Hygrometer ("Frame Hygrometer").
Wet and Dry Bulb Thermometers in a Wire Frame Egg.

so that the hen will not crush it when it is put in the nest. Now we didn't have these tubes on at first; we simply had two holes through the gauze, through which to insert the wet and dry bulb. I put these tubes on because I found that the hen was not particular how she treated the thermometer, and since they cost us $4.50 each we found we could not have her trifling with them. We could read off the hen's temperature by the dry thermometer and the humidity by the wet thermometer. I say that is the first nest hygrometer, and perhaps that is the only redeeming feature it has, that it is the first one.

I felt from the beginning there was something wrong with it, and, striving to find out what was wrong I happened upon what I consider one of the most important points. We will touch upon that later. Our wet and dry bulb readings and our humidity readings for hens were taken throughout the summer by this "egg hygrometer." We devised another later which we call the "frame hygrometer." The humidity under the first hen by the egg hygrometer was 75·7. The first seven hens, sitting on earth nests, averaged 76.2 per cent. humidity by this egg hygrometer. But, as I say, I felt there was something wrong with it. The first fear I had was that the evaporation from the linen gauze on the wet bulb thermometer in that egg would probably be sufficient to saturate the air under the hen, and consequently in that way we were vitiating our results—we were introducing a foreign element—and I set myself to determine the value of that objection. I have in this dish thirteen eggs laid close together, to cover the bottom. I want to know how much air there is under that hen. I take this flask, which contains 1,000 cubic centimetres of water, and I fill up the air space between the eggs with water, and then I will know how much air there is under the hen, because thirteen eggs is a fair setting. We will determine for thirteen and calculate for fifteen. That water just covers the eggs. I had 1,000 cubic centimetres in the flask to begin with; this flask holds 250 c.c. I will measure out what is left; the 250 c.c. flask is full, and probably 50 more in the large one; therefore we know how much air it takes to fill up the space between the eggs. It is 700 cubic centimetres for thirteen eggs. If you calculate on fifteen eggs you will find that it comes out 805 cubic centimetres of air under the hen sitting on fifteen eggs. I am going to use a little larger estimate. I will say 1,000 c.c. under the hen. I turn up these tables, and I find that at 100 degrees of temperature and at saturation pressure the air would hold 19.8 grains, which, figured out in the metric system, means that the water to saturate 1,000 c.c. of air at 100 degrees is equal to .045 grammes (this is one of the technical parts the chairman spoke about); that is equal to half a drop approximately; hence half a drop is sufficient to saturate the air under the hen.

The next point is, how much water is on that linen gauze of the wet bulb? Just one drop saturates it, and that does not wet it any too well. There can be a drop and a half or two drops on that gauze—never less than one drop. A hen sitting on a nest whose temperature is 100 degrees and where humidity is 50 per cent. would have how many drops of water in the air under her? If it was saturated at 100 degrees, she would have half a drop; but if the humidity was 50 per cent. she would have one quarter of a drop, and the drop on the wet bulb would be sufficient to finish saturating the air under her. Once it was saturated no more water would evaporate from the gauze.

The next point was to see if that theory was correct. I took this cork and put it on the stems of the hygrometer, and put the hygrometer in that bottle, which contains just half as much air as there is under a hen. I dried the bottle at the register before using it, and in order to get the air in the bottle the same as that in the room I swung it about for several minutes.

TABLE II. EGG HYGROMETER IN BOTTLE CONTAINING AIR.

Time in Bottle.	Humidity in Bottle.	Humidity of Room.
0 minutes	62.9	62.9
5 "	85.6	
10 "	87 9	
20 "	90.2	
40 "	92.7	
3 hours	95.2	

Here is a table shewing the readings of humidity in the bottle. First reading, when the air was put in, 62.9 per cent. The humidity had gone up to 85.6 in five minutes, 87.9 in ten minutes, 90.2 in twenty minutes, 92.7 in forty minutes, and I returned in three hours afterwards and the humidity in the bottle was 95.2. The cork did not fit perfectly tight, and so there was a little loss, else the air in the bottle would have been saturated. The next point: Will it do the same thing under the hen? Will it saturate the air under the hen as it did that in the bottle? To test this I took the egg hygrometer and put it under a hen for two hours. This table shews the conditions:

TABLE III. EGG HYGROMETER UNDER BUFF ORPINGTON ON STRAW NEST.

Time.	Nest Temperature.	Humidity in Nest.	Humidity of Room.
0 minutes	....	....	46.0
5 "	98.75	70.6	
10 "	101.25	69.7	
15 "	101.75	69.8	
20 "	102.0	69.9	
30 "	102.0	71.5(?)	
	Gauze becoming dry.	Gauze wetted afresh.	
40 "	102.25	70.0	
50 "	102.0	71.0	
60 "	100.5	69.6	
70 "	100.5	68.1	
80 "	100.0	64.4(?)	
	Gauze wetted afresh.		
90 "	99.5	69.3	
100 "	100.5	74.7	
110 "	100.5	72.6	
		Average 70.1	

Buff Orpington, on straw nest. The first column shows time under hen, the second the hen's temperature, the third the humidity under the hen, the fourth the humidity of room. Hen's temperature in five minutes' time, 98.8 degrees; and her humidity by this egg hygrometer was 70.6 per cent.; in ten minutes, temperature 101.3 degrees, and humidity 69.7. In fifteen minutes her temperaure was 101.8 degrees and humidiy 69.7. In twenty minutes her temperature was 102 degrees and her humidity 69.9. In thirty minutes the temperature 101.0 degrees and her humidity 71.5. The wet bulb gauze was becoming dry in thirty minutes under the hen, but in the bottle the gauze was not dry in three hours. The gauze was wetted again.

In forty minutes hen's temperature was 102.25 degrees; humidity under hen was 70. In fifty minutes hen's temperature 102.0 degrees, humidity under hen, 71·0. In sixty minutes, 100.5 degrees; humidity under hen, 69.6. In seventy minutes, hen's temperature, 100.5 degrees; humidity under hen, 68.1. In eighty minutes, hen's temperature, 100 degrees; humidity under hen, 64.4. I wet the gauze again the third time, and in ninety minutes hen's temperature was 99.5 degrees and humidity under hen 69.3. In 100 minutes hen's temperature 100.5 degrees; humidity under hen, 74.7. In 110 minutes hen's temperature was 100.5 degrees; humidity under hen, 72.6. The average was 70.1. I think we are in a position to say that it is not possible for that egg hygrometer to saturate the air under a hen. There it was two hours. Three drops evaporated and only a half drop necessary to saturate. That is the amount evaporated under that hen was six times the amount necessary to saturate the air in the nest, and it has not changed the humidity materially from the first reading, hence there is no danger of its saturating the air under her.

But since the hen is getting rid of so much moisture in her nest from this egg, then it may be that the gauze is preventing the vapour from passing away as fast as it otherwise would; that is, this egg may be bottling up the moisture, preventing it from passing away, thus giving a different humidity in the egg from what there was under the hen. If so, what I was doing was measuring the humidity in the egg instead of measuring the humidity in the nest. I must get something that will take the humidity under the hen, so I asked a tinsmith to make me up something like this. (See fig. 2, p. 89.) It is a frame of wire, which has two stems for the thermometers, and there are two central disks to keep the wires out in the shape of an egg. It has a core through the middle to make it rigid. You would not think those wires would keep much moisture in. Having that made I came up to put it under the hen. Now, you can imagine the interest with which I did so. I took the hen whose humidity we had determined by the egg hygrometer, a Buff Orpington, whose humidity by ten readings was 74.3; I put the frame under, and we got a reading of 60.1. I read it again and again, and that is what it would stay at. You see that the frame hygrometer is giving a far lower humidity, 14.2 per cent. lower. That gauze egg was bottling up the moisture. But I could not believe the difference to be so great, and I took another hen, a White Wyandotte, under very different conditions, away out under the evergreens. I put both hygrometers under her at the same time, one on one side of the breast and the other on the other side.

Table IV. First Comparison of Egg and Frame Hygrometer under Hens.

Hen.	Nest.	Egg hygrometer.		Frame hygrometer.		Difference.
		Remarks.	Humidity.	Remarks.	Humidity.	
Bu. O	Damp earth	Aver'ge of 10 readings	74.3			
"				One reading	60.1	14.2
W. W	Under evergreens	Egg on right	65.8	Frame on left	50.6	15.2
"	"	Egg on left	73.9	" right	59.8	14.1
		Reading by A. M. later in day	74.2	Reading by A. M. later in day	56.7	17.5

The humidity by the egg was 65.8, by the frame on the left the humidity was 50.6, a difference of 15.2, very nearly the same difference we had in the other case. Now we take it again, and the humidity is 73.9 by the egg, but the frame on the right side gives a humidity of 59.8, making a difference of 14.1, about the same as before. Yet I could hardly believe that, and I got Mr. McKenney to go out later, and he got a reading of 74.2 and 56.7, which made a difference of 17.5. Still, I was not satisfied, and I took another hen and put the egg and frame hygrometers under her, the egg on the left side with the wet bulb out away from the hen's body, and the dry bulb next to her body, and I found that the humidity was 69.4. That was with the egg alone. I was taking our first hygrometer and putting it in alone, as we had been doing for a good while. Twenty-five minutes later the egg on the left, with the wet bulb outward away from her body, had a humidity of 67.6, and at the same time I got a humidity of 53.0 by the frame on the right side with the wet bulb outward, a difference of 14.6. Twenty minutes later the egg on the left side, with the wet bulb outward, gave a humidity of 70.8, while on the right side the frame, with wet bulb outward, gave a humidity of 55.8, a difference of 15. With the positions interchanged, and after twenty minutes with the egg on the right side, with the wet inward, I got a humidity of 70.2, with the frame on the left side, wet inward, a humidity of 53.4, making a difference of 16.8; and again ten minutes later, by the egg on the right side with the wet inward, I got a humidity of 74.1, on the left side, by the frame, with the wet inward, a humidity of 56.2, making a difference of 17.9. Five minutes later still I got a humidity of 70·8 and 55.8, a difference of 15.0. Thus a difference between 15 and 16 represents how much the egg hygrometer is astray. If you average all the tests, you find a difference between the egg and the frame hygrometer of 15.9.

TABLE V.—SECOND COMPARISON OF EGG AND FRAME HYGROMETERS UNDER BUFF ORPINGTON HEN ON DAMP EARTH NEST.

Time.	Egg Hygrometer.			Frame Hygrometer.			Difference.
	Remarks.	Temperature.	Humidity.	Remarks.	Temperature.	Humidity.	
10.25	Left, wet outward	100.0	69.4	......	......	......	......
10.50	" "	99.0	67.6	Right, wet outward	99.0	53.0	14.6
11.00	Gauze dry, wetted	......	......	Gauze wetted	......	......	......
11.10	Left, wet outward	99.5	70.8	Right, wet outward	99.0	55.8	15.0
11.12	Positions interchanged	......	......		......	......	......
11.30	Right, wet inward	98.0	70.2	Left, wet inward	100.0	53.4	16.8
11.40	" "	99.5	70.8	" "	99.5	54.6	16.2
	Gauze wetted	......	......	Gauze wetted	......	......	......
11.50	Right, wet inward	100.0	74.1	Left, wet inward	100.00	56.2	17.9
11.55	" "	99.0	72.3	" "	98.5	55.6	16.7
12.00	" "	99.5	70.8	" "	99.0	55.8	15.0
					Average		15.9

TABLE VI.—HUMIDITY, EVAPORATION, CO_2 AND HATCH OF HENS.

Hens.	When Set.	Nest.	Humidity of air near hens.	Humidity in Nest.		Per cent. evaporation from eggs.	CO_2 in 10,000 parts.	Per cent. Hatched.	
				Egg Hygrometer.	Frame Hygrometer.			Of Fertile Eggs.	Of Total Set.
Buff O.	July 17	Under brooder	62.3	75.7	59.8	10.7	39.3 (3)	....	....
Buff O.	July 17	Damp earth in room	62.3	73.4	57.5	11.1	27.4 (3)	....	....
Buff O.	July 20	" " " "	66.2	76.0	60.1	11.4	24.5 (1)	91.7	73.3
S. L. W.	July 28	Ground, open air	....	76.9	61.0	11.8	20.0 (8)	84.6	73.3
W. R.	August 7	In artichokes	77.7	80.0	64.1	9.8	28.5 (10)	85.7	80.0
Buff O.	August 17	Earth, room	73.4	75.4	59.5	11.5	26.0 (3)	92.3	80.0
B. R.	August 22	In evergreens	67.0	76.2	60.3	11.5	23.4 (2)	75.0	60.0 (2 broken)
....	....	Ground, beneath box	....	....	....	10.2	....	100	73.0
Averages	....	....	68.1	76.2	60.3	11.0	27.0	88.2	73.3
S. L. W.	July 17	Chaff	62.3	73.9	58.0	11.4	22.2	....	....
Buff O.	August 17	In colony house	67.1	75.9	60.0	12.1	....	85.7	80.0
Averages	....	....	64.7	74.9	59.0	11.7	....	....	....
Buff O.	July 20	Board	66.2	76.9	61.0	13.3	18.9 (2)	78.6	68.8
Buff O.	August 17	Board	73.3	75.9	60.0	12.8	26.0 (3)	80.0	53 (5 broken)
Averages	....	....	69.7	76.4	60.5	13.0	22.4	79.3	60.9
L. B. 2	July 4	Ventilated	61.1	64.4	48.2	14.7	....	....	....
Buff O.	July 17	"	62.3	73.3	57.4	13.1	26.6 (3)	....	....
Buff O.	July 20	"	66.2	70.4	54.5	14.7	13.3 (1) (?)	77.0	66.7
Averages	....	....	63.2	69.4	53.4	14.2	19.9	....	....
B. R. 3866	August 7	Rubber	69.3	77.1	61.2	10.8	21.4 (10)	100.0	80.0
B. R. 7100	....	Rubber, no eggs	....	....	....	....	10.4 (10)	....	....
Averages of	all hens on	eggs	67.4	70.1	59.0	12.0	24.4	86.0	71.5

We now come to the humidity under the hens in general, Table VI. First hen had a humidity, as given by the egg hygrometer, of 75.7. Subtract 15.9 and we have the humidity by the frame. You subtract 15.9 from each of these different readings by the egg hygrometer, and we get the humidity under all these different hens by the frame hygrometer. They are 59.8, 57.5, 60.1, 61.0, 64.1, 59.5, and 60.3, an average for these hens on the damp earth of 60.3. The hen sitting on the chaff, 58.0, and the hen sitting in the colony house, 60.0, by the frame hygrometer. That would be on straw, and so I put the chaff and the straw together as one kind of nest and the two average 59.0, not very much different from the hens on the damp earth. Two Buff Orpingtons which had nests on boards, humidities by the frame hygrometer were 61.0 and 60.0, an average of 60.5. The average humidity of the air while hens were sitting on the boards was 69.7. You observe the humidity near the board nests was a little higher than near the chaff and the straw nests, and it is also a little higher than near those sitting on the earth, consequently we have a little higher humidity under the birds, a little higher on the ground than on the chaff.

Q.—Taking the earth room, not the evergreens, these are two different sittings?

A.—Yes, they are two different sittings. Let us follow that down. The ventilated nests by the frame hygrometer were 48.2, 57.4, 54.5, though the humidity of the air near these hens was 62.3 and 66.2.

Q.—Are these different hens?

A.—Yes: they are all different hens, sitting under the same conditions. An average for the ventilated nests of 53.4; just compare that with the humidity in the earth, chaff, or board nests.

Q.—What was the ventilated nest?

A.—The ventilated nest was made of an ordinary box bored full of holes, set about four inches off the floor. Wire would have been better, but we could not procure one. It is not strictly a ventilated nest, but it did the trick.

There was one ventilated nest where the humidity was very low, which brings down the average of the three. If you take the average of these two it will still be lower than under any of the other conditions. Now we take the hens on a rubber nest. This nest was made of sheet rubber, about one-sixteenth of an inch thick, put in a nest made out of a box, and with that nest we get a humidity of 61.2, a higher humidity than in any of the other nests.

Q.—What was the result of the hatch of that?

A.—One hundred per cent. of the fertile eggs. It was 80 per cent. of the total eggs set.

Q.—That was one of the very highest?

A.—Could not have had much larger than 100 per cent. There are several that hatched 80 per cent. of the total settings. This hatched us as many of the total set as any other hen had hatched. That is only one hen on the rubber nest; the next one might not be so high. A rubber nest is a good nest, but I do not know that it is any better than the earth or straw. Now, here is an earth nest with 85.7 per cent. of the fertile eggs. We cannot say that the rubber nest is better from that one test. I am dealing with the humidity, particularly at the present time; the average humidity of all the hens by the frame hygrometer is 59.0.

But there is a loophole there yet—does the frame hygrometer give the right humidity? But there is a point I should have mentioned before this, and it is, maybe these thermometers are different. When I first got that large difference between the egg and frame hygrometer, I took the thermometer out and dipped the two sets in water, and I found they agreed absolutely. I had one long thermometer and three short ones in the set. But they would not agree on the humidity when taken out of the egg and frame and used as two ordinary wet and dry bulbs, and it took about three days to find out why they would not give the same humidity, although the thermometers were all correct. In these three short ones and one long one the bulbs were of different sizes. The small ones were more sensitive, and would respond quickly to any change in the room. The long one was not as sensitive as the others because of its large bulb, and consequently it was just a little slow. Then I got four thermometers the same size and I tested them in the air; two hygrometers with four thermometers the same make, the same sensibility, and they would agree every time. This verification of the hygrometers was made before the final determination between the frame and the egg under the hen, and hence in that difference of 15.9 there is no chance of error due to thermometers.

Then the question comes in as to whether this frame was right. I took the frame hygrometer and tested it against an ordinary hygrometer of wet and dry, not protected, but exposed to the air in the free diffusion of the room. The frame hygrometer has the protection of the wire frame. This table will show you what differences they gave me, and how nearly they approached one another. Temperature of room 75.5, ordinary hygrometer 38.9, frame hygrometer 42.2, a difference of 3.3. The same temperature 40.7-42.6, a difference of 1.9. And so we can go on with it.

TABLE VII.—COMPARISON OF FRAME HYGROMETER WITH ORDINARY HYGROMETER IN ROOM.

Temperature.	Ordinary Hygrometer.	Frame Hygrometer.	Difference.
75.5	38.9	42.2	3.3
75.5	40.7	42.6	1.9
75.5	40.7	43.0	2.3
75.5	38.9	41.2	2.3
75.5	38.9	42.6	3.7
76.0	41.2	44.8	3.6
76.0	38.9	42.6	3.7
67.0	64.2	66.6	2.4
95.0	74.6	74.6	0.0
76.0	34.0 (fanned)	34.0 (fanned)	0.0

With a humidity of about 40, that averages up about 3 per cent. difference between the ordinary and the frame. Making the humidity of the room 64.2 at a temperature of 67, there is only a difference of 2.4; making the humidity 74.6 and temperature 95 they read the same, the ordinary and the frame do. Therefore, at high humidities, such as we have under a hen, there is very little difference between the ordinary hygrometer and the frame hygrometer. I think that establishes very conclusively that, by the frame hygrometer, we are not far astray from the hen's humidity.

I was talking with Mr. Nix last night, and I hope he will excuse my mentioning his name. Mr. Nix was conversant with some of our results, and he asked me this question "Have you discovered yet where all this moisture under the hen comes from?" and I said "No." Well, I have changed my mind, and I think I can show you where that moisture comes from.

Twenty-five eggs which we weighed yesterday weighed 1,413 grammes and their volume was about the same, hence they are about the same weight as water. Fifteen eggs at the same rate would weight three-fifths of that, or 848 grammes. That is the weight of a setting of eggs, 848 grammes—say 850 grammes, just to make it easy. Now these hens evaporated 12 per cent. of the weight of the eggs. If we multiply 850 by 12 we have the amount of water that is evaporated from these eggs, 102 grammes of water in nineteen days, they being last weighed on the nineteenth day. Now it takes .045 grammes to saturate the air under a hen. If we divide the amount necessary to saturate the air into the total water that was evaporated, we will find out how many times this water would saturate the air under a hen. That comes out 2,266 times. Divide this by 19 and we find out how many times a day—119 times a day. How many times is that an hour? It is almost exactly five times. That is, there is evaporation enough under a hen to saturate the air five times an hour. Does that not answer very well where the humidity comes from under a hen? It seems to me it does. Calculated on thirteen eggs and 11 per cent. evaporation, the evaporation would saturate the air under the hen four times an hour, or ninety-six times a day.

Q.—Is there any comes from a hen's breast besides?

A.—I don't know.

Q.—Does a hen sweat?

A.—I do not know. We asked Dr. Reed, and he says there are no sweat glands in a hen's breast. All we can say is that so far as we know there are no glands.

Mr. Cyphers: There are supposed to be none.

Mr. Day: The same calculation with regard to a 110-egg incubator run dry shews that the evaporation from the fertile eggs is only sufficient to saturate the air in the incubator ten times a day. No wonder, then, that the air in the incubator is so much drier than that under the hen.

I am going to touch now upon another conclusion that we drew from these experiments with the hygrometer under the hen. I have shown you that with this hygrometer in a bottle three hours the gauze was still wet at the end of the time, and the air in the bottle was almost saturated. I have shown you that with the same hygrometer, the egg hygrometer, under a hen for two hours, the humidity remained at about 70 per cent., and was practically constant throughout the two hours. That was a surprising thing to me, and it suggested the idea of whether there was not quite a rapid change of air under the hen. If that hygrometer remained constant, is it not probable that there is a change of air under her? There is no doubt that there is a change of moisture going on through that gauze very rapidly. Of course, provided there was no change of air, the moisture would still come to the outside air, although the outside air was of a higher humidity. There is a point that is worth noticing. The humidity of the hens, an average of 59.0; the humidity of the room in the vicinity of the hen, 67.4, and yet the moisture is coming out all the time from under that hen. The temperature is different, and at a higher temperature of 100 and a humidity of 59 the vapor in the air is producing a little more diffusive force than is the vapor at the room temperature, and a humidity of 67.4. Now, by the vapor pressure we mean this: If you were to take a certain amount of vapor in a rubber sack, nothing but vapor in it, and you were to remove the pressure from the outside of the sack, that vapor would expand the rubber sack; that is, the vapor is exerting a pressure, and whether the moisture will travel from the nest to the outer air or from the outer air to the nest depends upon the difference in vapor pressure. If the vapor pressure under the hen is greater than that in the air, although the humidity in the air is higher, then the vapor is going to travel from the low humidity to the high humidity; and that is no doubt what takes place.

Now, the question occurred to me, was not there a change of air under the hen? and these various tests I have made tend to bear out that suggestion. Now, the egg and the frame hygrometer under the hen show as great a difference as they do in the ordinary air. This test I have not told you about before. Taking the egg and the frame in the ordinary air, how do they compare? I took them and laid them over the edge of an incubator, and thus had the egg and the frame in the room temperature, under the same conditions. This table will shew you the results. When the temperature of the room was 76 and the humidity 40.7, there was a difference between them of 23.3; again, temperature 68, humidity in the room 66.3, a difference between the two of 12.7. If you take the average of 23.3 and 12.7 it will not be very far astray from the average of 15.9 under the hens. These are not all the tests made. I tested them time and time again in the air, and at middle humidity I always got a difference between them of from 12 to 15 degrees; when the humidity was very low I got a difference of about 23. When the temperature of the air was 96, the humidity at that temperature being 48.9, the difference between the egg and the frame readings was 9 per cent.; the difference between them if I fanned them was 11.6. You see, at this high temperature and low humidity fanning increased the difference. I do not know how far the fan was away from them. Next time I put the fan ten inches away, and right above, and there was 11.1 of a difference, with a humidity of 48.9. Humidity 49.2, with fan one inch away, the difference was 3.7; humidity 52.4, with fan eighteen inches way, a difference of 7; fan ten inches away a difference of 10.7; the fan six inches away, a difference of 12.8. This is at high temperatures. In order to produce a difference between the egg and the frame that I got under the hen I had to cause a good deal of circulation of air with that fan, and there was a certain distance at which the fan would give a greater difference between them than at any other; that was about six inches. We watered the floors and the walls and the ceiling, and the humidity came up to 74.6, and the difference between

TABLE VIII.—COMPARISON OF EGG AND FRAME HYGROMETER IN ROOM

Room Temperature	Humidity of Room by Ordinary Hygrometer.	Difference between Humidities given by Egg and Frame Hygrometers.
		Per cent.
76	40.7	23.3—diffusion
68	66.3	12.7 (2)—diffusion
96	48.9	9.0—diffusion
	48.9	11.6—fanned
	48.9	11.1—fanned 10″ away
	49.2	3.7—fanned 1″ away
	52.4	7.0—fanned 18″ away
	43.7	10.7—fanned 10″ away
	48.9	12.8—fanned 6″ away
	FLOOR WATERED	
95.5	74.6	3.5—diffusion
		.3—fanned 6″ away
		5.2—fanned 10″ away
		3.1—fanned 18″ away

the egg and the frame was 3.5. If I fanned the two six inches away there was no difference at all between them; that was too much circulation at that humidity. If I fanned them ten inches away the difference was 5.2. If I fanned them eighteen inches away the difference was 3.1. At this high temperature I could produce a difference between the egg and the frame by a certain amount of circulation over them. These experiments lead me to believe that there is a considerable change of air under the hen. We had put enough water under a hen to saturate the air six times over, and yet it did not raise the humidity very high, but gave us a large difference between the egg and frame readings; and we have seen that proper circulation gives a large difference between these two hygrometers; and therefore I draw the conclusion that there is a considerable circulation of the air under a hen. Not as much circulation as would be indicated by the difference of six times the saturation amount of water, because a certain portion of that vapor would go away by diffusion, provided there was no circulation; but I think some of that rapid escape of moisture is due to circulation. I have shown you that under the hen with her eggs there is enough moisture evaporating to saturate the nest five times over every hour. That was calculated on all kinds of nests, and under that we had a very high evaporation from the ventilated nests. So that the true evaporation under hens sitting on ordinary nests such as earth or chaff, instead of being 12, is only 11. If we leave out these three ventilated nests and the boards, then the average of 11.1, 11.7, and 10.8 becomes 11 per cent. If that is figured out in the same way, it indicates enough moisture from eggs alone to saturate the nest four times an hour instead of five.

All that moisture does not escape by diffusion. Some of it, I believe, is escaping by a change of air under the hen. The questions is, "How does this change of air take place?" Just the same as we asked, " Where does the moisture come from?" we now ask, "How does this circulation of air take place?" You all know that air which is heated rises if it is is in contact with air which is cool. Under the hen there is air that is heated, and there is cold air which comes in contact with it at the outside of the nest. Now, the warm air will escape at the top of this little opening next the hen's body, and the cold air will come in at the bottom of the opening by the natural process of convection. Heated air rises and cold air sinks when they are in contact with one another. That is not assuming that there is escape of air any other way than by diffusion and natural convection. But if you ever watch the hen as she sits on the nest, you notice the feathers rise and fall. I do not know whether she does it all the time or not, but we have observed that fact.

Q.—Would not that be due to fear?

A.—I do not know.

Q.—Do not they do it more in warm weather?

A.—I believe they do.

Mr. Baldwin: Is it the motion of their breathing?

A.—Partly I believe, but I think there is another reason for it. Just as a dog has a way of cooling himself when he is warm by putting his tongue out, so the hen fluffs her feathers. Every time the feathers go up some air is drawn in among them, and when they fall some of the air is forced out; this is a process of cooling the hen. Whence is that fluffing going to draw the air? Is it going to draw some of the warm air that is coming up from her eggs, drawing it up through the feathers or is it going to draw in cold air? It seems to me that so long as this natural process of convection is going on at the edge of the nest when the hen fluffs up her feathers, there is a certain amount of warm air drawn upward from the nest, and a certain amount of cold air comes down into the nest, because of that fluffing. It seems to me that these two considerations, convection and the fluffing, if we had thought them out before the idea of circulation was suggested by our experiments—it seems to me that they would have led us to the conclusion that there is and must be some circulation under a hen. I think that is a rational conclusion from consideration of these natural laws alone, to say nothing of the results we have shown by the hygrometers.

How does the circulation in an incubator compare with that under a hen? I know you are asking that question. That is a question, however, I cannot answer. The first suspicion of circulation came to me on August 31, and it was not until September the 5th that I was satisfied. The students were coming in on September 15th, so it was absolutely impossible for me to go into the question of circulation in incubators to any extent. We had about one dozen experimental machines, and all I could do was to make a hurried run over them, and the only conclusion I had come to was that the circulation in an incubator was very erratic and very uncertain, speaking of them as a class. I can get a difference between the egg and frame in one minute of twelve or fifteen, and the next minute I cannot get a difference of more than two or three between them, showing me that there is a fluctuation in the circulation that is going on in the incubator. We hope to do more on that subject in the coming season. There is room for a great deal of study, and we hope to have the pleasure of continuing it.

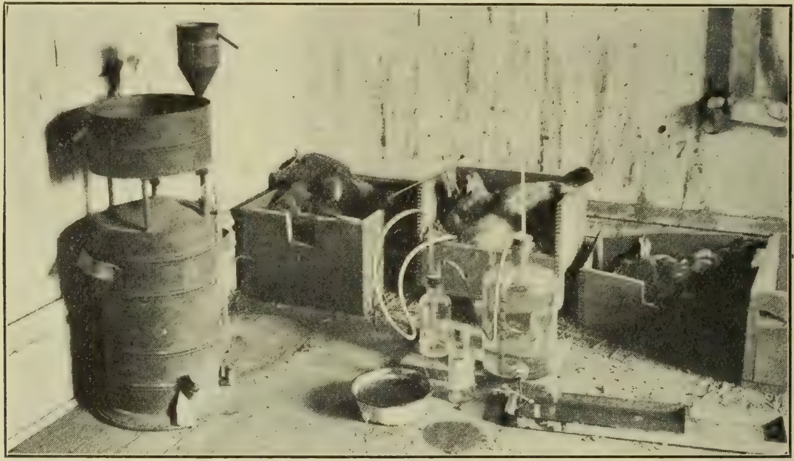

Fig. 3.—Drawing Air from Hens' Nests, for Determination of Carbon Dioxide.

That ended our work on humidity and circulation. During all this time other tests had been going on, upon the amount of carbon dioxide under a hen, and the amount of carbon dioxide in the incubator and also in the room. This apparatus is used for drawing off the carbon dioxide from a hen. It is an ordinary water bottle with an opening near the bottom, where a glass tube with rubber nozzle is inserted, a pinch cock to control the flow of water. The bottle is graduated: the first ring on the tube represents 500 cubic centimetres, the next 500 more and so on, each ring adding 500 c.c. Here is a small bottle fitted with a rubber cork with two glass tubes through the cork; one of these tubes is passed to the bottom of the bottle and the other just goes through the cork. Into this bottle a little caustic potash is placed, 100 c.c. of it, and this bottle is attached to the large one by a rubber tube, and a long rubber tube is attached to the glass tube that reaches the bottom. This long rubber tube is inserted into the nest or into the incubator, and the water in the large bottle here is set at zero or at one of these rings, and that pinch cock is opened and the water is allowed to drop gradually out of the bottle. As the water runs out of the water-bottle the air has to come in, and the only place it can come from is under the hen. It goes in and down through the long tube to the bottom of the bottle and bubbles up through the caustic potash and is drawn into the large water-bottle, and when we have 500 c.c. of air drawn through from under the hen it is indicated here, and we stop and cork up the small bottle and the caustic potash is taken over to the laboratory and the amount of carbon dioxide in it determined. Mr. Thom, of the department of Physics, has made the CO_2 analyses.

These tests of carbon dioxide were being made throughout the season. Chart No. 1 shews our CO_2 determinations in rooms and incubators. The amount of carbon dioxide in the front room is 3.3 parts in 10,000; incubator No. 2 with no eggs 3.2 parts in 10,000. Here is another with no eggs, New Prairie State, 3.3 parts in 10,000. If you are conversant with the literature on the subject of carbon dioxide you will know that three parts in ten thousand is about the standard amount, so we have the standard amount of carbon dioxide in the atmosphere excepting in the incubator room. The incubator room at the hen's level contained 4.6 parts in 10,000. The incubator room at the machine level contained 2.8 parts in 10,000, but it might be changed a little with different readings, that is the average of several. What about the incubator? Chatham 5, with three readings, had an average of 8.9; Chatham 6, with two readings, 8.1, three readings, 6.5; Blank Chatham, three readings, 9.3 of an average; Chatham 4, with two readings, 7.8; New Prairie State, 19 readings, 7.3; I will show you the reason we had such a large number as that in a few minutes. In two readings with the old Prairie State we had 6.7, three readings, 5.6; Model, 4 readings, 5.4; making an average for all machines wet and dry of 7.3 parts of carbon dioxide in 10,000.

The carbon dioxide under hens is given in Table VI., Buff Orpington, under a brooder, 39.3, an average of three readings. That is unusually high; the next one, Buff Orpington on damp earth an average of three readings, 27.4; Buff Orpington on damp earth, 24.5; Silver laced Wyandotte on the ground in the open air, 20.0, 8 readings; White Rock in the artichokes, 10 readings, 28.5; Buff Orpington in the evergreens, 2 readings, giving 23.4; making an average for the hens on earth nests of 27.0 in 10,000; Silver-laced Wyandotte on chaff one reading, 22.2, Buff Orpington on boards, 18.9 for two readings; three readings, 26.0, an average of 22.4; on the ventilated nest three readings, 26.6, one reading, 13.3, the average of those readings give us 24.4 parts in 10,000 under the hens.

There is another interesting fact about this carbon dioxide, and that is it appears to be pretty constant, and in order to test this point one hen, a White Rock, in a field was read from time to time. I have the readings here I will give them to you.

TABLE IX. CARBON DIOXIDE WITH WHITE ROCK IN FIELD.

Aug. 9	22.2	Aug. 21	22.2
Aug. 11	15.6	Aug. 23 (1)	37.8
Aug. 16	20.1	(2)	33.4
Aug. 17	24.5	(3)	44.5
Aug. 20	26.7	(4)	37.8

Mr. Baldwin: Did you notice the atmospheric conditions during these observations?

Mr. Graham: We can tell you by referring back what the humidity was each day.

Q.—Can you tell me does the carbon dioxide in the air under ordinary conditions vary to any great extent?

A.—Very, very little. All the readings I have seen were in the neighborhood of 3 parts in 10,000, and all the authorities I have consulted on the subject give 3 in 10,000.

Mr. Baldwin: When a rain storm comes it washes the carbon dioxide into the ground, so that the fresh air you find is due to the clearing of the atmosphere?

A.—I would say that the oppressive condition of the air before a rain is not due to the carbon dioxide, but to the amount of moisture. Evaporation requires heat, and perspiration coming from the body takes a certain amount of heat as it evaporates, and that cools us. Before the rain, however, the humidity is very high, and this evaporation cannot go on as fast, and consequently there is not the same cooling effect, and we feel the air oppressive. After the rain the air usually becomes cooler.

These last four readings on Aug. 23 are all abnormally high, but they are constant. These four readings show very little diminution, I would not like to give that as an entirely representative condition.

Q.—Might that not be an error owing to the deterioration of your alkaline solution?

A.—That alkaline solution was treated in this way: when a certain amount was taken for measurement another amount was tested for its strength, and when the bottles went over to the laboratory the error in the alkaline solution, if there was any, was subtracted from the readings under the hen. Thus we eliminated any error due to change in the solution.

Mr. Nix: I remember looking over a great many of these records, and know that the carbon dioxide the last day was always higher than at any other time during the hatch.

A.—It seems to me it certainly is.

Mr. Graham: The idea on Aug. 23rd was to see if I could pump that hen dry; I worked at it from eight in the morning till noon, and as soon as we got out 500 cc. of CO_2 we took another bottle, taking 2,000 cc. altogether.

Mr. Baldwin: How long does it take to get out 500 cc. of air?

A.—I would say from half an hour to an hour. This taking out 2,000 cc. removed twice the volume of air that was under the hen, and it did not produce any reduction in the carbon dioxide.

I would not like to give that as a representative condition. It was only one test that was made. These ideas were a growth on us, and we give the readings to you as we took them, and we give you as many as we took. We are waiting for further light on these points, but we are giving you our results to date. Furthermore, the carbon dioxide is lower, but also practically constant in the incubator. There was a companion experiment to that with a Prairie State machine, and these are the readings for it:

Table X. Carbon Dioxide in New Prairie State Incubators.

Average of all incubators, 7.3. (See table 9.)

Aug. 11	5.0	Sept. 11 (1)	7.6
Aug. 14	10.0	(2)	7.3
Aug. 15	8.9	(3)	7.4
Aug. 17	9.7	(4)	7.8
Aug. 23	4.5	(5)	7.8
Aug. 24	10.0		

Mr. Baldwin: These were not all taken in the same run in the same machine?

A.—Those in August were taken in one run, and those in September in another run; but the point is, that in drawing out this air, one thousand c.c. at a time, from the incubator, and drawing it out five times in succession on this last day, gave us a constant reading throughout.

Mr. Baldwin: Can you explain that, why it is so?

A.—I think there must be some carbon dioxide coming from the eggs.

Mr. Baldwin: When you were drawing it off, didn't you have free ventilation?

A.—No. These in September are a little lower, because it was the beginning of the hatch. They are from the egg level. I expunged the top and bottom readings, taking only those at the egg level, as these were the only ones we needed for the purpose of illustration here. Those on the top show a lower carbon dioxide than those on the bottom.

Mr. Baldwin: Any very great variation?

A.—Not very much; a little. We might make note of the evaporation. We had mentioned 11 per cent. on all hens, excepting those on the boards and the ventilated nests; the boards and the ventilated nests were both high. In the incubators the evaporation is also very high.

Mr. Baldwin: That is an average evaporation. Was there any marked characteristic about the individuality of the eggs?

A.—Yes. Mr. Graham will probably deal with the individuality of eggs. Take Chatham 5, with one of those little fans running fifteen hours, from 7 in the morning till 10.30 at night, the evaporation was 11 and 12.5 in two successive runs.

Mr. Baldwin: Was that taken by the weight of the eggs or by the barometer?

A.—By the weight of the eggs. The same machine, 11, all coming very close to the hen's evaporation; 9.1 was the reading on two selected lots of eggs that were in the same incubator, and it is abnormally low.

Q.—Still using the fan?

A.—No; this is another machine, Chatham 6, dry without fanning, the evaporation from the eggs being abnormally low. Next hatch, 14.6. In the next hatch, 14.8; in the next machine, Blank Chatham, 15.8; Chatham 4, dry, 14.6; Chatham 4, with moisture on top, 14.0.

Mr. Baldwin: There is a contrast. There is not that difference in the evaporation?

A.—There is a difference in ventilation.

Q.—What difference in ventilation?

A.—The door expanded with top moisture so that we could not shut it, and therefore for a considerable time the door stood a little open, and that made a greater evaporation. The evaporation with the bottom moisture was 11.1 per cent.

Mr. Baldwin: The point is that on June 25th, dry fanned, 11.0 was the percentage of evaporation, but with 20 per cent. higher humidity given by moisture in the bottom the evaporation was also 11. Is not that fanned, too?

A.—This, June 25th, was fanned. This, Aug. 20, was run under normal conditions.

Mr. Baldwin: If it was fanned, what would have been the difference?

A.—The moisture seemed to be more distributed when it was fanned. Then the evaporation here, where two machines were run at the same time, Blank Chatham, dry, 15.8; Chatham 4, dry, not fanned, 14.6.

Mr. Baldwin: The moisture on top, not fanned, 14.0; there is very little difference between this and the same machine run dry.

A.—Chatham 4, moisture on top, is the one that had the door open, and we planed it several times, and now there is a quarter of an inch crack since it dried out.

Q.—There ought to have been a question mark to that?

A.—There ought to be a question mark.

Old Prairie State, 15.8; another Old Prairie State, 15.3; Charles A. Cyphers, 16.6; Model, 16.7; the averages of all dry machines, 14.6; averages of all wet machines, 11.4. The wet machines, you will understand, approximating very closely to the evaporation under the hen on a natural nest.

Q.—Which is the best system to apply moisture—fanned at the top, or the bottom?

A.—I would apply it from the bottom; the top moisture gives too much moisture. It gives so much that the timber in the machine swells up and racks it all out of shape. We could see the moisture condensed on the closed door.

Q.—Is not that a good sign on hatching day?

A.—This condensation on the door continues all the hatch, and after a few days there was saturated air by the door.

Mr. Baldwin: There is the ventilated nest; per cent. of evaporation 14.7 in the first case, and in the third case gave 14.7; the next case 14.3. It comes pretty near the same as the averages of these dry machines.

Q.—Is there a great distinction between the dry machines and the ventilated nests?

A.—No, but the hatch is low. The hatch is lower than the machines. I am going to leave the hatching and individuality to Mr. Graham; he has prepared that.

To sum up, we find out as a result of our work this summer, that we have high carbon dioxide under a hen. We believe there is high circulation; we are satisfied that there is high humidity, and we have low evaporation. As a common result. in the dry machines we have low carbon dioxide, low humidity, high evaporation, and, we believe, a variable circulation. I say we believe on this circulation point, because it came to us at the end of the season, and we did not have the time to do all the work we wanted to do; but still we have done enough to make us believe that there is a good circulation taking place under a hen, and likewise a variable circulation in the incubator.

Mr. Baldwin: In the same incubator?

A.—Yes, in the same incubator. We have in all the wet machines low carbon dioxide, high humidity, low evaporation, and, I think, a variable circulation. To my mind the wet machines are approaching the hen's conditions. It would, perhaps, be out of place for me to say anything about the design of an incubator, but if I were designing one I would endeavor to make that incubator fit the hen's conditions with regard to the circulation. I would endeavor to have the air that is coming in a little cool. I would admit some cool air below the warm. I do not know what would come of it, but I think I would endeavor to secure that condition, because I am satisfied there is a certain amount of cool, fresh air coming down into the nest.

A.—Must not that intermix with the air almost at once, so that when the air strikes the eggs it must be mixed?

A.—Yes; and that is the difficulty in an incubator, that you have nothing to mix the air if you admit it at different temperatures into the machine.

A.—What is your conclusion regarding the evaporation?

Mr. Day: Hens sitting on normal nests average 11 per cent.; machines dry average, 14.6; machines wet, 11.4, so that the dry machines are much higher in evaporation than the hens.

That brings us to the conclusion of our investigation on this subject. I have only to add that it seems to me our first problem is to find out what are the laws that govern the physical conditions existing under the hen. When we know them I believe the mechanical part of applying the hen's conditions to the incubators will be a comparatively easy matter. We hope that we have taken one step nearer the solution of what the conditions under a hen are.

Mr. Cyphers: What were your conclusions from the fact that there was a variation between the humidity readings of the two hygrometers, the egg hygrometer covered with gauze, and the other one?

A.—That screen has been bottling up the moisture in the egg.

Mr. Cyphers: Does not it bottle up the moisture under the hen the same way?

A.—There is no doubt that they do introduce some moisture under the hen.

Mr. Cyphers: When you add the moisture under a hen, are you not getting a higher degree of humidity than if you were not putting that moisture in?

A.—I think we are getting a little higher humidity under the hen when putting the moisture in there than we would without, but I have taken these two hygrometers in, I think, about all conditions, and I find that when I get a high temperature and high humidity with high circulations, they approached one another. When I get a low humidity with a circulation and a high temperature, then they differ widely. Let us refer to table No. VIII. The largest difference I could produce by circulation between these two when the temperature was 95.5 and the humidity 74.6 was a difference of 5.2, but at these middle humidities I could produce a difference of 11 and 10.7 by the proper circulation. This was without bringing into operation the difference between the warm and the cold air in contact, as we have in the nest. We have warm air under the hen and the cold air outside, and that difference of temperature brings about a difference of vapour pressure under the hen and in the air. Although the humidity is high, there is no doubt we increase it to a slight extent under the hen; but I think we have shown you that keeping these hygometers under the hen for two hours does not raise the humidity from the first reading, hence the moisture is not much bottled up under the hen. Besides, the greatest difference I can get between the frame hygrometer and an ordinary one in air was only about 2 to 3 per cent., on the average, and at high temperatures they read the same. So that the frame comes very close to the true humidity.

Mr. Nix: In the hygrometer tables published by the United States Meteorological Bureau at Washington, there is a reading for swinging thermometers and ne for still thermometers. When I heard of this experiment I thought that was the principle involved. A difference in the variation depends on the movements of the cylinder, and consequently you should be able to determine the air movements by the differential reading when using that gauze screen.

Mr. Day: How can you get that? Suppose there is a circulation under the hen, how can you get the readings with and without fanning? May I say we tried that. We have an apparatus rigged up to fan the hygrometer under a hen, but when you start to fan, the hen takes an excursion.

A Member: That would not be necessary if the air current was under the hen?

A.—Where are you going to take your still reading?

A Member: You have me there. I see that is impossible.

Mr. DAY: That is my contention—that the reading is a fanned reading under the hen; that the conditions are nearly perfect under her.

Q.—After you introduced the moisture, will it not increase the pumping operation? Will she not pump out that moisture?

A.—My impression is that the hens do not behave quite normally when we are experimenting with them, but there are some of them that are exceptionally good compared with others, and these ones that behave are the ones we have used for these experiments. I do not know whether she would pump a little more because there was a little more moisture there or not. I doubt it.

Q.—The readings under the hen are practically fan readings. Will the humidity under the hen agree when you take that reading without supplying any more moisture from the bulb of the thermometer?

A.—From all our experiments we believe the moisture under the hen is about as indicated by the frame hygrometer.

Mr. NIX: Your error from table No. VIII. is very slight. It does not amount to over 3 per cent.

Mr. DAY: In supplying the moisture to that bottle the point is whether you have it corked. If it is not corked, the moisture will not be bottled up. The same applied to the hen's nest.

TABLE XI. EGG AND FRAME HYGROMETERS IN A SMALL PAIL AND COVERED WITH A BOOK.

Temperature.	Time in Pail.	Humidity.		Difference.
		By Egg.	By Frame.	
98	0 minutes	63.6	54.6	9.0
	2 "	62.7	58.4	4.3
100.0	7 "	67.7	62.0	5.7
100.5	11 "	69.4	65.0	4.4
100.5	16 "	72.6	68.0	4.6

The egg and frame hygrometer were put in a pail and a book put over it. Now, that is pretty close to the hen's condition, if she bottles up the moisture from the hygrometer; the only thing it lacks is cold air outside. Yet the hen's humidity remained stationary during two hours, while the humidity in the pail rose from 63.6 to 72.6 in sixteen minutes.

Q.—Did you have the pail heated?

A.—We had the whole room heated. We have not the cold air outside the pail, but that is a condition we will have before we will meet again.

Q.—If the pail was made of a screen covered with a porous texture?

A.—That would answer, I think. As I say, the circulation idea came to us at the end of our term's work.

Mr. CYPHERS: You assume that the hens are the best mothers?

A.—I think that all our results establish it.

Mr. CYPHERS: Then, in other words, the hen will hatch more eggs than any incubator that can be made?

A.—I do not say that. I did not understand your question; but she is the best that has been made for hen eggs. She may not be the best incubator that can be made.

Mr. CYPHERS: She is not your best model?

A.—She is the best model so far.

Mr. **Cyphers**: What about the little dipper that nests out in the marshes—the fish ducks? They will build on a very shallow floating mass or leaves and muck; the eggs will be from half an inch to an inch from the lake; it is anchored by a weed and the bird sets on that. The whole mass must consequently be wet?

A.—The duck is not a hen, and what suits the hen will not suit the duck, and while the duck might be a better incubator to the duck eggs, these conditions I do not believe would apply to hen's eggs, because every bird has its own habit and its eggs have their own individuality.

Mr. **Cyphers**: We take the bird of Australia that buries its eggs in vegetable matter; what's the humidity around that egg?

A.—It would be high, it would be 100 per cent.

Mr. **Cyphers**: That is an open question. There is more or less moisture, and I doubt very much if there is saturation.

Mr. **Day**: There might not be saturation, but I believe there would.

Mr. **Cyphers**: How about the carbon dioxide and the amount of vegetable matter?

A.—It would be high, I think.

Mr. **Cyphers**: Go back to the dry nest. How about the male ostrich sitting on a nest of eggs along the borders of the Sahara desert where the bird has to set all day in the bleaching sun, where the sun would shrivel the flesh of a man, in order to get there to take the eggs. Wouldn't you have a dry condition?

A.—That is an ostrich egg.

Mr. **Cyphers**: But we hatched ostrich eggs in the same incubator as we hatch the hen's eggs, with very nearly the same treatment.

A.—That doesn't say that a hen's egg requires just the same treatment as an ostrich egg, and the ostrich egg the same treatment as a hen's egg.

Mr. **Cyphers**: We have the same results with very little difference in the actual treatment.

A.—It doesn't say you get as good results as an ostrich would get.

Mr. **Cyphers**: No two hens act alike, and you have two different conditions there.

A.—That is so; but you take hens as a class they have an individuality compared with other birds; ostriches have an ostrich individuality; ducks have a duck individuality, a class individuality; and in the same way their eggs have an individuality corresponding to the class they are in.

Mr. **Cyphers**: I cannot get a uniformity with the hens.

A.—Did you ever get a uniformity with anything? But you take the average conditions of a hen, and the average conditions of a duck, and the average conditions of an ostrich, and they will not necessarily be the same. The hen's average conditions will be one thing, the duck's average conditions another, and the ostrich's average conditions another; while there is an individuality between the members of the same class, yet each class, I believe, has a class individuality, with variations in the class, of course.

Mr. **Baldwin**: We have in that column carbon dioxide an individual variation both of the hens and in the nests. Is that variation in the carbon dioxide, from your observation, due to a change more of condition, of individuality of the hen, or to the situation of the nest; an individuality of the nest, or an individuality of the hen?

Mr. **Graham**: Some of that variation would come in this way, you might have three-quarters of your sample of air drawn out from under the hen and she shifts a little. I do not know whether this pumping out causes a tickling sensation or not, but when you get about through she jumps off.

Mr. Donovan: I think to make that column right we should expunge 13.1 from 18.9.

Mr. Baldwin: There is one case where you made ten tests of carbon dioxide, and there was an average of 28.5, and in two tests you only got 20.

Mr. Graham: That might be in individuality; the humidity in these hens' nests was 59.

Q.—Do you consider that the excess of evaporation of about 4 per cent. in the dry machine impaired the vitality? Wouldn't it bring out more chicks, the dry?

A.—It does sometimes, but it impairs their vitality.

Mr. Graham: That is only a supposition.

Mr. Day: In regard to their vitality, yes.

Mr. Graham: I would say for Mr. Cyphers and Mr. Nix, that if we are going wrong on this, tell us. You don't hurt our feelings at all. Anything and everything you have to say, say it out, and if you can turn us around I wish you would do so. It would save us a great deal of time and money, and we would be glad to have you tell us the proper way to run machines so as to hatch 100 per cent. of the eggs we put in and raise 100 per cent. of the chickens. We would be well satisfied if we could raise all that we do hatch.

The Chairman: I say, for all of us, that we appreciate very much Mr. Day's work. He has spent three hours in the presentation of his subject, and I congratulate him on the way he has put it. It is a very scientific matter, and I appreciate his effort to put it in a more popular way.

INCUBATION.

By J. L. Nix, Homer City, Pa.

Mr. Graham has just asked me to criticise the work presented to us by Mr. Day, and to tell you how to hatch 100 per cent. in an incubator—either of which I am loth to attempt to do. The scientific work done in artificial incubation at this station is new and valuable. I have been working in the same field, and have been getting approximate results. Mr. Day's experiments are to be commended for their scientific accuracy, and as largely eliminating the matter of guess work. Too much theoretical work has been done in incubation in the past. Beautiful theories in artificial incubation have been built up without any basis to sustain the positions of the authors. Most of the work done in the past has been in a large degree experimenting in the dark. All kinds of devices for incubating eggs in every conceivable manner have been tried, somtimes with fairly satisfactory results and at other times more or less failure has resulted. Any and all who may use incubators should be thankful to this station, as the work has been taken up from a scientific standpoint.

Aritificial incubation is very difficult and an intricate subject, even though it has been practised for thousands of years by the Chinese and Egyptians. The Chinese do not hatch over 50 per cent. of the eggs set, and those are from eggs laid during the natural season when fertility is high—results that can be surpassed by the most inferior incubator upon the market to-day. There are a number of factors involved in artificial incubation. The main factor, the one that has the largest influence, is heat. When a uniform temperature is applied to the eggs, moisture and ventilation may vary widely and yet satisfactory hatches may be obtained. Yet even when, as far as we can see, the heat, ventilation, and relative humidity of the egg chamber is as nearly perfect as is possible to obtain, there seems yet to be something lacking. We believe incubators are yet capable of great improvement, and that in the future much better results will be attained than at the present time.

The incubator does not have quite the hatching power of the hen. Both seem to carry the eggs along equally well up to the first test—the sixth or seventh day. The death loss in the incubators from that period on is higher than under hens. The percentage of loss in the incubator is affected by extremes in temperature variations by too much or insufficient ventilation or too little moisture in the air of the egg chamber. Even when conditions are the most unfavorable strong chicks hatch, but the weak ones succumb. Usually the death loss in incubators is during the period of exclusion, and in a great number of instances where parallel tests have been made, the death loss during this period is larger in an incubator than under the hen.

Mr. Graham: Is that all with one make of incubator?

Mr. Nix: My tests were made with five standard makes of incubators. The hens were placed in the same incubator room, with incubators, and all were set with the same kind of eggs. The eggs were all carefully shuffled, and on the first test the percentage of variation of live germs would be less than 5 per cent., occasionally between the different machines it would be less than 2 per cent. Two tests were made with an average of 15 per cent. in favor of the hens. Tests made in England, by Prof. Brown, were between 10 and 15 per cent. in favor of the hen; and tests made at this station at Guelph, were about 10 per cent. in favor of the hen.

A Member: In the second test with your hens did they do as well?

Mr. Nix: You cannot determine the exact difference in hatching power between the incubators and hens by a few tests. There are so many things to be taken into consideration. I only made two parallel tests, and I am not entirely satisfied. Results are so influenced by the operator, location of the room, and the season; each and all of these have a great effect upon the results. Where the best manipulation is used and the environment suits the incubator, the difference between the hens and incubators grows less.

In the past season a few experiments were made in determining the influence of moisture upon the result in hatch, but the matter is still in doubt. In these experiments it made no difference whether the machine was run dry and had an amount of evaporation upon the eggs, or whether the machine was run with high humidity. Evaporation of the eggs ran from 9 to 12 per cent. The percentage of hatch was the same in all of the machines, the only difference was in the appearance of the chicks. Chicks that were hatched in the damp atmosphere had every appearance of being larger; the down at times would be one-half longer than on those chicks hatched in the dry incubator. It is very difficult to establish a fact in artificial incubation, because we get so many contradictory results; but so far as my observation goes the eggs that have been hatched in this high humidity have a larger amount of vitality and can stand more abuse, are easier to raise, and will survive under conditions in which dry hatched chicks will succumb. The first experiment reported along this line has been by C. R. Graham at the Storrs Experimental Station. Eggs were incubated in the Prairie State over wet sand, in an English Hot Water Incubator with moisture attachment, and in a non-moisture machine. The difference in hatch in the various machines did not vary over ten per cent. The chicks from each machine were toe marked so that they could all be identified, half were put in a brooder, and half from each machine under hens. These chicks did not receive the best of care during the summer, and in a large degree had to rough it. When the chicks were counted in the fall only two chicks were living that were hatched in the dry incubator, 50 per cent. of those hatched in the hot water English Incubator, and 70 per cent. of those hatched over the wet sand. This is only one comparative experiment upon result of vitality in incubation. It may have been accidental, but the indications are very suspicious indeed of moisture having an influence upon the vitality of the chick.

What are commonly called the unknown factors in incubation are those elements of which we have a suspicion, but as yet have not determined their exact value, and one of these is carbon-dioxide. The physiological effects of this gas have not yet been determined experimentally, and there may be other secretions from the hen's body that have an influence. Future developments in artificial incubation will be along this line.

Quite a field of experimental work has been opened up. I will try to give you a view of this field, whether there is anything in it can only be determined by the future. You must first have a conception or theory, sometimes based on very slender assumptions. The influence of carbon dioxide upon incubation theoretically is very plausible. In those animals in which the young are brought forth alive, the embryotic or fetal blood is slightly charged with carbon-dioxide, the carbon-dioxide being in much greater excess than in the blood of the adult animal, for the reason the fetal blood is oxygenized by the lungs of the mother and the circulation through the placenta is very slow with the result that the carbon-dioxide is held back so that the fetus during the entire period of development is partially asphyxiated. This is natural, and the same thing appears to occur in natural incubation, although the development takes place outside of the hen's body; yet the egg is immersed in a bath of carbon-dioxide, the amount being from 12 to 15 times the amount found in normal air. Physiologically, carbon-dioxide has a retarding influence upon the action of the heart. Exactly what effect it has been upon the embryo no one has been able to determine. So it now seems that the development of incubators and incubation is not any more a mechanical problem as it has been in the past. The mechanical process of distributing the heat, ventilation, and the application of moisture seems to have almost reached the limit of development. The results to be gained in the future will be in the departments of physics, chemistry, or microscopy. The microscope will be used in the observation of embryotic blood in the egg in any and all conditions. The first thing to be determined is what is normal, and then what changes occur in the morphology of the blood by abnormalties in incubation, the effect of dry air, of damp air, and the effect of more or less carbon dioxide in the incubating egg chamber. It seems to me that we ought to find something there, but I am not prepared to say that we will. Human blood shows the slightest change in the physiological condition; the influence of surroundings, food, age, breathing of impure gases, cause blood degeneration that is very readily revealed by chemical and microscopic examination, and we do not see why the same results cannot be attained by careful examination of the embryotic blood in artificial incubation. The amount of carbon dioxide eliminated by the hen is very great. The amount eliminated by a human being (weighing 150 lbs.) is approximately 100 gallons in twenty-four hours.

Mr. Baldwin: What is the percentage of carbon dioxide in the human blood?

A.—I think it is in the neighborhood of forty points.

Mr. **Baldwin**: *The Medical Journal* says that, when the pulse is seventy-five the carbon-dioxide is 2 or 3.9 volumes per cent. That would be 3.9 to compare with your percentage.

Mr. **Day**: What about volumes per cent.?

A.—The work to which I referred, the point was not clear.

Mr. **Day**: It seems to me that it means that 100 volumes of blood will contain 3.9 volumes of carbon-dioxide.

Mr. **Nix**: Water will absorb almost an equal quantity of carbon-dioxide, and I would think that where the oxygen was forty that it would mean forty per cent. in volume. The effect of gases upon the blood is a new subject, one in which but very little information can be obtained. Where gas escapes in a room, and is breathed by human beings, the blood change is very marked, and can be determined chemically, especially the influence of carbon dioxide. This may be perhaps very scientific, but it has a bearing on artificial incubation especially in regard to the influences of carbon-dioxide. The most that is known upon the influences of carbon-dioxide is upon human beings. We know of no reason why the same conditions in a more or less degree will not hold good upon all kinds of animal life.

You have had Mr. Day's explanation as to where the moisture came from under a hen, and you have his solution given from the evaporation of the eggs. I put the same question to a professional histologist, and he made this reply—I give this as another man's view point: He began by saying that a frog breathes very largely through the skin, something like 75 per cent. and only 25 per cent. through the lungs, while in a human being we have 5 per cent. through the skin and 95 per cent. through the lungs. When the incubating instinct comes upon the hen there is a change of the capillary circulation on the under side of the hen's body; it becomes gorged with blood, and there is quite a perceptible amount of breathing through the skin, oxygen is absorbed and carbon dioxide and moisture eliminated. In the absorption of oxygen in the hen's body; oxygenizing of the tissues, carbon dioxide is set free as a by-product. This is eliminated by the lungs and skin. He further stated there were no sweat glands in the hen, and that it was not perspiration.

Mr. **Graham**: How did it get out?

Mr **Nix**: There is a difference between respiration and perspiration. Perspiration is a discharge from glands in the human being,—the sweat glands; while respiration is the elimination of gases through the pores of the skin.

Q.—Where did that hen get the carbon dioxide?

Mr. **Nix**: In the breaking down of the tissues, when oxygen is absorbed through the lungs or skin, it combines chemically with the carbon in the body, and is eliminated in the form of carbon dioxide gas.

Mr. **Day**: Why cannot the hen pass out the carbon dioxide and moisture from the surface of the body just the same as in the lungs?

Mr. **Nix**: That was the position of the histologist. This supposition is further borne out by an experiment made at this station. In a number of experiments with hens, glass eggs were substituted for natural hen eggs. The humidity and carbon dioxide were taken in those nests, and in those nests that were tight, especially the rubber lined nests, they found that the carbon dioxide and moisture was practically as high as in the nests that contained the natural eggs.

Mr. **Day**: Do you think there is more of this moisture from the hen than there is from the eggs? Do you not think there is more in the nest of a hen sitting on eggs?

Mr. Nix: Yes. You will find on examination of these charts and reports of this station that the carbon dioxide elements do not increase very much, if at all, from the first to the last day, as you would naturally suppose. If the carbon dioxide came from the eggs, during the latter part of the hatch we would expect a great deal more, but in a great many instances the carbon dioxide was less during the latter part of the hatch than at any other period. This might be explained from the fact that the hen is more inclined to move and fluff the feathers during the latter part of the hatch and the carbon dioxide escapes. I have examined a great many of these reports, and there appears to be a great many contradictions, so it is quite difficult to arrive at a positive conclusion.

Mr. Day: On the question of humidity, do you remember that it amounted to an evaporation from the eggs sufficient to saturate the air under a hen four times an hour. The amount of water to saturate 1,000 centimeters is the actual result of a large number of measurements. Since then I have made the same calculation for an incubator. An incubator has very much larger space, and there is only enough evaporation from the eggs in the incubator to saturate the air ten times in twenty-four hours. I took the average evaporation in the incubator.

Mr. Nix: The evaporation from the eggs will bring the humidity up very high in an incubator, provided ventilation is slowed up sufficiently, and this has been a common practice in Rocky Mountain regions, but I cannot believe that chicks secured in this manner are equal to those secured with a freer ventilation.

Mr. Baldwin: In what way can you save all the carbon-dioxide in artificial incubation?

Mr. Nix: I know of no way of retaining carbon dioxide in an incubator without reducing the ventilation to an injurious amount. If carbon dioxide is of value in artificial incubation it will have to be supplied artificially. We are very liable to make an incorrect theory or build up ideas in regard to incubation that are of no value. Simply because the hen places her nest on the ground, it does not follow that the ground is an important factor in incubation. The only value the ground has is in preventing the gases in the nests from escaping. The experiments here demonstrate that fact very conclusively.

As another factor that may be worth consideration is the influence of temperature the first twenty-four hours upon the final results. Mr. Baldwin has given us a resume of a French work upon monstrosities. This physician demonstrated the fact that the influence of abnormal conditions the first few hours of development is what produced monstrosities. His experiments were performed principally with hens' eggs, for the reason they were easy to obtain. By too much heat or too little heat the first twenty-four hours abnormalties were produced. Deformed chicks were the result almost every time, and anyone who has used incubators will have noticed that, where temperature has run too high or temperature has been too low, or the incubator contains a hot or cold spot, the percentage of deformed chicks is very much higher. This experimenter maintains that the most important part of the incubating period is the first twenty-four hours. It seems plausible. The hen brings the temperature up very quickly. The shell is a very good conductor of heat, the embryo floats in the top of the shell, and the temperature is practically uniform and constant the first twenty-four hours. This condition is extremely difficult to reproduce in an incubator. We cannot bring the temperature up quickly in an incubator for fear we would get too much, and the general practice has been to bring the temperature up very gradually.

To try the effect of development the first twenty-four hours, I constructed an incubator with a large hot water tank, brought the temperature up to 101½ degrees, and the amount of water was so great that putting the eggs in did not affect the temperature. The eggs were kept at a constant temperature for thirty hours. There is a theory that the albumen of the egg contains sufficient oxygen to supply the germs from three to seven days. So much for the theory; now as to the results. The germs started all right. An equal quantity of eggs were placed in an ordinary incubator. Upon the first test those eggs that were started in the water bath were 35 per cent. behind the eggs that were started in an incubator. The second test about 50 per cent. more were dropped out of those that were started in the water bath, and but very few chicks hatched; while the eggs started and developed in the incubator the whole period hatched all right.

Mr. Day: How did this French experimenter bring his temperature up quickly?

Mr. Baldwin: I think he used an incubator where there is an absolutely uniform temperature—a bacteriological oven.

Mr. Graham: Is that book astray?

A.—Not necessarily. My experiment simply shows that oxygen is necessary for the growing germ from the moment it starts.

Mr. Day: Do you know if a water bath introduced any water into the eggs?

A.—I do not think so.

Mr. Day: I will tell you the reason I asked the question, and why we determine the volume of these eggs by the water. We watched the little bubbles of air coming out of the eggs. It seemed to me that at least there was water going in.

Mr. Baldwin: I think the method you adopted was not the best one—to make the experiment with eggs smothered in water.

Mr. Nix: I attribute the poor results in the water bath to a lack of oxygen and not to the effect of the water. It seems to me it is a very important point, one worth investigating—the influence of heat or manipulation the first twenty-four hours of development.

Mr. Robertson: Did you ever apply pure oxygen in an incubator?

A.—I have not.

Mr. Graham: We put some pure oxygen in the machine some years ago, and it was not satisfactory. It seemed to burn the chicks up; they used too much oxygen, possibly.

A Member: How many times is it necessary to turn the eggs in a day?

Mr. Nix: That point has not been fully determined. We do a great many things in incubation from tradition, and never ask the reason why. It has been the general practice to turn twice a day. I met a person at one of the shows who said that last season he tried an experiment of hatching and never turned the eggs at all, and he claimed to have hatched 65 per cent. of the fertile eggs; but I should like to see the experiment tried before accepting the statement as conclusive.

A Member: Do you think a square machine will hatch more than an oblong one?

A.—The shape of the machine would have nothing to do with the result of the hatch unless the shape influences the distribution of the heat. As a rule, with a long, narrow machine it is more difficult to get a uniform temperature than in one that is approximately square.

Q.—Then a round machine will hatch better than a square one?

A.—I have never found that a round machine did any better work than a square one. So far as my observation goes, a well constructed square machine will show a more uniform temperature than a round one.

PRACTICAL EXPERIMENTS IN ARTIFICIAL INCUBATION.

By W. R. Graham, B.S.A., O.A.C., Guelph.

I do not know whether it is altogether policy for me to talk to you about our work in connection with artificial incubation. Most of you who have been attending the sessions of the Institute are largely, by this time, filled up on this question of incubation. You have heard the scientific side and the practical side, and it appears to me it is almost a waste of time for me to talk to you about our results and work on the practical side in connection with this subject. Over and above all this, a good many of you have heard me tell what little I know about artificial incubation.

However, I might say that from a practical side it is a very complicated problem, and the more experimental work we do in conjunction with scientists the more experiments and the more experimental work is required to be done; for the simple reason that the moment we take up one problem we find that problem becomes two; and when we get two going, we find that there are four, and when we get four they become sixteen. The moment we get one problem there is another branching up. I have at the present time enough problems on incubation that can be worked to advantage to keep ten to fifteen men busy all season on nothing but artificial incubation. I do not expect to solve all these problems in my life time, and my ideas on artificial incubation are purely cosmopolitan. If anybody else wants to take the problems up and work them out, I would be glad to have them do so.

The difficulties in connection with the subject is this: In the beginning there is so much depends on the eggs you are working with. The eggs vary, as I will show you by a chart. The eggs vary considerably by the individuality of the hens. Each hen has an individuality of her own. Some hen's eggs will hatch in almost any condition—what you might call good, bad, and indifferent. There are hen's eggs that will require skilful manipulation, or they require the very best science and art in order to hatch good chickens from them. Eggs vary more or less in that respect. In addition to that, there comes up the question of the individuality of the chickens which are hatched under these various processes. For example, you will notice in these charts that we have been able to hatch eggs under a wide range of variation of evaporation.

My opinion at the present time is that the humidity of incubators, or will say the size of the air cell in the egg which is being incubated, or the loss in the weight during the process of incubation, has no material effect upon the percentage of hatch. The only true way to gauge or to measure the evaporation of the eggs during the process of incubation is by weight. The size of the air cell I do not think is much of an indication, because we find the eggs vary so, individually. Each egg has a peculiar characteristic of its own, and you can take half a dozen eggs and hold them up to the light, and take half a dozen operators and they will have half a dozen opinions as to whether the air cell is small or large. When you weigh them you find what percentage they have lost. You need, when weighing eggs, a pair of scales that are accurate. If you use a pair of scales that weigh a quarter of an ounce or finer you can establish fairly well the evaporation of your eggs, weighing them on the ninth day when you make the first test, and again on the eighteenth day, when you close your machine.

I should like to add that the Poultry Division of the Experimental Union would like to get, if possible, this season a large number of experimenters, who will weigh the eggs that they are incubating, the object being that we want to find out and to have a check on our own results as to what effect moisture has upon vitality of the chicks. Those of you who have seen the photograph of moisture chicks and dry-hatched chicks will have noticed that there is a difference in the appearance of the chicks. I cannot say at the present time that a moisture chick has actually more vitality or more stamina than a dry-hatched chick. We have not followed the experiment long enough to say one way or the other. It is one of the lines of our investigations from a practical standpoint this year, along with Prof. Day's scientific side of incubation.

We have had some results which probably should not be talked about. That is, moisture chickens, so far as we have observed, have a considerable advantage in mortality over the dry-hatched chickens, or, in other words, we have had a much higher percentage of chickens live and thrive that have been hatched under moist conditions, as compared with those hatched under dry conditions. You might wonder why we did not work this problem last year. It was almost the end of the hatching season before it established itself in our mind to be worthy of consideration. We did not consider that this was a very serious problem until the middle of August, and as we ceased our operations of the incubators about the middle of September we did not have much time to follow it. We have been watching the chicks this winter, and the results so far are about as stated previously. I have no doubt that a hen can hatch chickens under a wide range of evaporation, and I have found in growing these chickens that there is a difference in the growth made by them; a difference in their vitality according to the manner in which the chickens are hatched. The question of vitality appears to me to be the most important question of the hour. We must be able to hatch large numbers of chicks that will develop into strong, thrifty, vigorous birds, capable of turning food into the finished product at minimum cost. Without vitality we cannot do this, and from the practical side I would like to impress upon you to watch the chickens from a vitality standpoint.

No.	Machine.	No. of weighed eggs.	No. of infertile eggs.	No. of decayed eggs.	No. of fully formed dead in shell.	No. of chicks hatched.
1	New Prairie State, No. 1, moisture machine........	30 15	4 4	3 1	6 2	17 8
2	Model No. 2 Incubator	15 15	2 3	1 ...	2 2	10 10
3	Chatham No. 3 Incubator, no moisture used.........	15 15	2 2	... 1	3 1	10 11
4	Open Bottom No. 4, Prairie State.............	15 15	4 2	1 3	2	8 10
5	Chatham Incubator No. 4. Moisture applied from the top.....................	15	1	1	3	10
6	Chatham Incubator No. 5. Moisture applied from the bottom..................	15	1	1	1	12

No.	Average evaporation of the hatched eggs.	Highest evaporation of the hatched eggs.	Lowest evaporation of the hatched eggs.	Percentage hatched of the selected eggs.	Percentage hatched of of the fertile selected eggs.	Percentage hatched of the entire machine.	Percentage hatched of fertile eggs of entire machine
1	9.1	13.7	5.9	56.6	65.4	61	70
	9.25	11.5	7.1	53.3	72.7	50	68
2	16.3	24.5	11.7	66	76.9	48	70
	16.12	18 6	12.7	66	83.3	51	75.4
3	14.0	17.7	10.2	66	76.9	47	65
	13.81	15.7	12.3	73	84.6	54	64.9
4	15.37	19.2	11.9	53.3	72.7	45.7	65
	15.75	18.9	12.7	66	76.9	60.6	75
5	12.	16.9	8.6	66	71.4	57.4	71
6	11.1	21.2	6.9	80	85.7	61.7	76.3

In connection with our incubator experiments last year, we used in each incubator fifteen to thirty selected eggs. What I mean by selected eggs is that these eggs were laid by trap-nest hens. They were practically the same hens' eggs that we were using for incubator purposes under the natural method—under the hen. The balance of the incubator was filled with common eggs. We wanted to keep data principally on the selected eggs. They were practically the same eggs that were going under the hens, and we wanted to watch these carefully.

Mr. Donovan: Selected from what?

Mr. Graham: Trap-nest hens. You will notice, following this chart all the way through, that in nearly every case the selected eggs hatched better than the total eggs set in the machine. That was a conundrum to me, for the reason that the selected eggs in every case were given considerble exercise. For example, it takes a man nearly one hour to weigh fifteen eggs with grain weights. Those eggs were weighed on the fifth day, the tenth day, the fifteenth day, and the eighteenth day of incubation. While these eggs were being weighed, the entire tray of eggs was left out in the room, or they were aired in a room of ordinary temperature for one hour. When the selected eggs kept hatching all the time better than the other eggs, it began to develop in our minds that possibly.exercise was a good thing for the eggs—that is, in weighing the eggs we had to put them in a basket and carry them in to the scales, and when they were in the scales they were moved back and forth until the scales balanced, and the idea suggested itself to me that probably what we wanted to do was to put the whole lot of eggs into a basket and walk around the plant with them.

The last machine I ran I filled the entire machine with selected eggs from trap-nested hens—practically the same hens that we were using throughout the whole season. In that hatch there was no perceptible difference in the results between the weighed eggs and those not weighed, individually. We want to follow that more closely this year. It does not appear from a scientific standpoint that there is anything in exercise. As I said at the beginning, this is a very complicated question, and one has to be very careful in drawing his conclusions. This year we are at the present time trap-nesting a large number of hens, with the idea of selecting, we will say, 150 normal hens to do our incubator experimental work. I want to use the same hen's eggs in natural incubation and in artificial incubation, and I want to use the same hen's eggs in the dry machine, as well as with moisture and in the carbon dioxide machines, and at the end of the year we hope to see if there is any difference in the size and maturity of the chickens. You have to make very careful comparisons in development and size, color of plumage, in their power to consume food in the way of fattening or egg production. One may have some opinions of his own, but in this particular instance it is probably better not to state them. I have a weakness for thinking that the old hen knows how to do her business.

You have heard discussed the question of carbon dioxide, and how to apply that is quite a question. If anyone wishes during the season to use milk in incubators in the way we operated the machine in the experimental room, I will undertake to furnish the bacteria to make the odor that was so characteristic in that incubator. In the place of using the ordinary moisture in the tray we used sterilized skim milk, and into that skim milk we put bacteria which we got from the bacteriological laboratory. Its purpose was to give off the carbon dioxide gas. I venture to say that that machine would not hatch chickens, but at the same time it hatched a slightly higher percentage of chickens than other machines of the same type. Exactly what we gained in the amount of carbon dioxide in that machine I cannot tell you at the present time, because I have not the analysis of all the gases. With the test we made there was a slight gain that might be worth trying again. The reason I would like to have a number of co-operative experiments outside is that I am inclined to believe that incubators are subjected to environment. I do not like to entertain that idea, but my observation leads me to believe that they are. I think Mr. Baldwin has observed the same thing. I know that incubators here sometimes, especially some makes or designs, give quite different results in different cellars. We have had an opportunity of testing incubators in about six different rooms. Some of these machines gave quite different results in different rooms, and the results may be due to the conditions of the eggs at the various seasons of the year in which the incubators were operated. In running the machines in the various rooms it was not to test the incubators for environment; it was merely to meet the conditions of the operators. We wanted to run the machines at Macdonald Institute so that they would be convenient for the ladies to look after the machines, and each experiment that had been carried along that line has been done principally for the convenience of the operator.

Mr. Donovan: You have settled that point in your mind?

Mr. Graham: I am satisfied in my mind. I have no data to prove it. The reason I mention this point is that we may come to a conclusion here with our machine, that so and so is the proper way to operate a certain machine to get the maximum hatch. I am not sure that that would be the proper way to operate that machine in some other locality. I have no proof to prove one way or the other, but that is one of the dangers I see.

Mr. Baldwin: Do you get a record of the pressure?

Mr. Graham: We have not done so. With co-operative experiments with incubators we have got to get down to the scientific side of it. The more detail we get on those charts the less charts we get back; they confuse the men when they get them. I would prefer the loss in the weight of the eggs during the incubating period to knowing the humidity of the room or incubator.

Mr. Nix: In regard to weighing the eggs, for the ordinary operator they do not have easy balance for using the grain weight, and in my experience I use the six-day apparatus, and that evaporation the first six days—six to twelve days—is practically uniform; and in my later tests I weighed the whole tray of eggs and weighed it on an ordinary scale, and I deducted the weight of the tray. At the end of six days I weighed the tray again, and thus got the evaporation loss. Multiplying that by three, and I had approximately what you would get with the grain weights with a great deal of pains at the end of eighteen days.

Mr. Graham: I suggested that they weigh their eggs on the ninth day, and weigh again on the eighteenth day, and use a set of scales that weigh to the ounce. Probably you would make your test there, and take out the infertile eggs and deduct that from the entire weight. I want to draw your attention to one fact of setting hens in the winter time. I think the proper way to set a hen is to get her to sit out of doors on the ground, as nature would have her. If you take a hen and set her in this room on straw or on a nest that is partially ventilated, you will not get a hen under normal conditions. We had a hen setting on rubber cloth. The rubber was washed perfectly clean, and after the hen had been sitting on that nest for six days we could get scales that came off the hen's body—scales off the feathers and off the skin.

Q.—What kind of scales?

A.—I do not know. I presume they came from the feathers and skin. I had also some doubts as to whether six inches of earth in the box in the summer time would give the same conditions that we get outdoors. So far as I can see, we get practically the same results with six inches of earth put in the bottom of a box in which you set a hen as you get with a hen sitting outdoors on the ground. If you set a hen on rubber you will get just as good conditions as you can get outdoors. There is a difficulty in operating the rubber nest. The rubber should be laid slack enough, so that the eggs will not pile up in the middle, and so that the hen can have plenty of nest room. We had a hen set in the artichoke field, in one of the lowest parts of the field, and while she was incubating we had several rain storms. I have seen the humidity at the outside of her nest as high as 85; she had very moist conditions, and her evaporation was lower than any other hen. The hens sitting inside of the building, on rubber, had nearly the same amount of evaporation.

The rubber nest, I think, may be of some practical value to those wanting to hatch chickens with hens in February, March, or early April. To get the temperature at which a hen incubates we tried using the paper as Mr. Baldwin did. The results were 100 to 107 degrees, and it varied, no matter in what position you put the thermometer under the hen. My impression was that we were getting mostly the hen's temperature, not the temperature of the air in which she was incubating the eggs, and when Prof. Day designed the wire eggs for taking the humidity, we thought we were getting nearer to what the air temperature was around the hen during the process of incubation. We found the temperature of the air around the hen, as indicated by the thermometer, was not higher than 102 degrees, mostly 101. We found, in addition to that, that when we came to compare incubators of the same make at temperatures of 101, 102, and 103—of course, you will find in the summer time that an incubator probably varies more than it does in the winter time, in mid-day they are apt to go up a little—that we got better results in operating our machines at a temperature between 101 and 102 than we did in any other temperature.

From a practical standpoint, I like to operate a machine with two thermometers—one hanging up and a clinical thermometer on the eggs—for the reason that I then get the maximum temperature that is registered any time during the day. One has to be very careful about testing a thermometer. A thermometer may be right to-day, but six months from now it may be one or two degrees out. A thermometer that was accurate last summer two weeks ago was 2½ degrees out. You have to test them practically every year to know where you are at.

Mr. BALDWIN: A friend of mine showed me a good idea with regard to taking the temperature of the hen compared to the temperature in the incubator. He took an ordinary egg and scattered its contents. He made a small hole in the small end of the egg, and he inserted a small glass tube that went down to the bottom of the egg. Before he inserted the tube he dropped in some sealing wax, and then put in the glass tube, so as to fasten the glass tube at the end. Before he inserted the glass tube he had two holes cut in the glass tube, and he filled this part of it with cotton batting. Then he had a clinical thermometer that fitted inside this glass tube, with the bulb opposite that hole, and he put around the clinical thermometer some cotton batting to stop it, and also to close it to stop any heat. That is a method any person can try, and I will say this, that in tests which Dr. Wagner made he found that under a hen the temperature in the center of the egg was 101.2 degrees. He then tried the same thing in the incubator, and he found that to get 101.2 degrees in the center of the egg he had to get 103 degrees on the top of the egg. He found that quite independent of any observations I was making, and I came to the conclusion that 103 degrees was the right temperature at the top of the egg, as I explained yesterday.

Q.—Did you ever see genuine rotten eggs in an incubator?

Prof. RICE: I never have.

Mr. NIX: If they were under a hen for a day or two previously, I have. I think those decayed eggs—those popping kind— come from an inoculation of bacteria that is contagious. Just by rubbing the eggs together they will inoculate.

INDIVIDUALITY OF EGGS LAID BY THE SAME HEN IN EVAPORATION AND HATCHABILITY.

Hens No.	How Incubated.	Percentage Evaporation	Result.
5,142	Machine No. 1...............	8.0	Hatched.
"	"	8.2	Decayed.
"	"	5.9	Hatched.
"	"	6.6	"
5,905	"	7.8	Fully formed, dead in shell.
"	"	8.9	" " "
"	"	8.3	Hatched.
"	"	8.4	"
234	Hen on ground...............	13.0	"
"	Machine No. 5...............	10.0	"
"	Machine No. 6...............	8.3	"
"	Hen on raised nest...........	11.3	"
"	Hen on board and straw nest..	9.6	Chick about one half formed.
"	Machine No. 4...............	17.8	Hatched.
"	Machine No. 3...............	10.2	"
"	Machine No. 2...............	14.1	Fully formed, dead in shell.
50	Hen on raised nest...........	23.5	Hatched.
"	" "	20.0	Fully formed, dead in shell.
"	No. 3 Incubator.............	13.6	Hatched.
"	Hen on raised nest...........	14.5	Fully formed, dead in shell.
"	" "	12.3	Hatched.
"	" "	14.2	"
"	Hen on ground...............	11.6	"

INDIVIDUALITY OF EGGS LAID BY THE SAME HEN, ETC.—*Continued.*

Hens No.	How Incubated.	Percentage Evaporation	Result.
50	Hen on ground.............	7.3	Fully formed, dead in shell.
"	" "	7.2	" " "
7,099	Machine No. 5...............	19.7	" " "
"	Machine No. 6...............	15.1	Hatched.
"	Hen on raised nest...........	16.7	"
"	Hen on board and straw nest..	14.3	"
"	Hen on earth nest............	21.1	"
"	Machine No. 3.	24.7	Fully formed, dead—a deformed chick.
"	Machine No. 2...............	22.6	Hatched.
"	Hen on rubber nest...........	15.5	"
"	Hen on ground...............	12.9	"
"	Machine No. 1...............	11.3	"
"	Hen on ground...............	14.4	"
"	Hen on ground in doors......	17.5	"
"	" " "	15.1	"

Mr. GRAHAM: This chart was designed to show the individuality of hens, in the evaporation of the egg content, and in the hatchability of the eggs.

The eggs from hen No. 5142 are low in evaporation. The four eggs were all set in machine No. 1. This machine has a moisture device, and we were using as much moisture as we could. Some would say we were trying to drown the chicks in the shell. Chicks hatched from this hen's eggs with an evaporation varying from 5.9 to 8 per cent. I might add that 5.9 per cent. is the lowest evaporation we found in any egg during the season.

Hen No. 5905 lays eggs which evaporate on the average more than do in the eggs from 5142. The eggs from No. 5905 are a good illustration that the evaporation is not the cause of fully formed chicks dead in the shell. We find here eggs with an evaporation of 7.9 per cent. and 8.9 per cent, with fully formed dead chicks in the shell, while eggs with an evaporation of 8.3 per cent. and 8.4 per cent. hatch.

The eggs laid by hen No. 234, hatch under a wide range of evaporation, and it will be noticed that her eggs were set in many machines and in nests of different designs. Her eggs hatched with over 100 per cent. variation in evaporation, as is shown in No. 6 incubator, where the eggs hatched with an evaporation of 8.3 per cent., and in machine No. 4, where the evaporation was over 17 per cent.

We will next consider hen No. 50. She would lay about six eggs a week, and keep at it a good portion of the year, but we had difficulty in getting chicks from her—on the average, about four chickens from thirteen eggs. Practically all her eggs are fertile, and each egg has an individuality of its own. Under a hen on a raised nest the evaporation is 23½ per cent. of the hatch; or, when we hatched these chickens from her eggs, we practically lost a quarter of the egg content. There are three of her eggs under one hen, sitting on the raised nest. Each egg has a different evaporation, and if the evaporation influence the hatched, the eggs with 14.5 per cent. and 14.2 per cent. should have both hatched; but the result is one chick and one fully formed dead in the shell. Then, taking the hen on the ground outdoors and 11.6 per cent. hatches, 7.3 do not, 7.2 die. This hen did not consume enough oyster shell to make proper shells on her eggs. We had to feed her egg shells in order to get good shells on the eggs. We find that a great many of the hens that have oyster shells do not get enough lime.

Mr. Rice: I have heard of them taking the oyster shells away from the chickens to make the shells weak, so that the chickens could get out.

Mr. Graham: Here is a hen—No. 7099—that has an individuality of her own over and above any other hen on the farm. She was a regular machine to lay, and her eggs will hatch under almost any condition. Her eggs are large evaporators; they will evaporate more than any other eggs, and yet they turn out chickens. If it was possible to state that a certain percentage of evaporation was the proper percentage to go by in order to get a good hatch, the wide variation in evaporation of this hen's eggs alone would upset the theory. You can follow her here down the column, and see she turned the trick at 100 per cent. difference in evaporation. She hatched chickens here 11.3 per cent. evaporation. The egg was set right alongside of an egg from 5142, with an evaporation of 5.9. There is 100 per cent. difference in the two eggs in the same incubator. Chicks hatched from her eggs at 11.3 per cent. and at 22.6 per cent. of evaporation. The egg set in machine No. 3 had 24.7 in evaporation, and the chicken was alive when we broke the egg, but it was deformed. There is only one egg which we got from that hen which failed to hatch. This one had 19.7 per cent. of evaporation.

Mr. Rice: What is the evaporation—the loss in weight—of the egg shown by how many weighings?

A.—Four weighings—on the fifth, tenth, fifteenth, and eighteenth days.

Q.—This is simply the total amount?

A.—The total amount of evaporation. If you had 100 pounds of eggs in an incubator, and if you take the average of the hens as the proper amount of evaporation, you would require to lose eleven pounds. We calculate that an egg weighs two ounces in the beginning; at the end of eighteen days it has lost 11 per cent. of what it weighed at the commencement. I have not seen any great difference of evaporation between the fertile eggs and the infertile eggs.

Mr. Nix: I weigh the eggs in grains before they are put in the incubator and mark the weight with pencil on the egg. You can in this way go along and test as much as you like, and take the same egg on the eighteenth day, and you have the same thing with that individual egg.

Mr. Baldwin: I have a letter from Mr. Wagner, and he said that Du Risque wrote on moisture, and gave 102 degrees as the maximum heat for normal incubation. Bear in mind, however, that his eggs were applied to a uniform heat all around, so that 102 degrees probably reads the temperature in the center of the egg as well; and Dr. Wagner states that in order to get this temperature he had to get the heat on top to 104 degrees.

Mr. Donovan: Is that in contact with the egg?

A.—Yes, to produce a temperature from 101.2 to 102 degrees.

Mr. Nix: Did he take any test for the germ temperature?

A.—He said that could not alter it.

Mr. Nix: In the first three or four days there is not any blood circulation.

Mr. Graham: Take the machine that you operate at 104 degrees, and I can give you results off hand of a hatch. One machine at 101 degrees hatched 65 chickens five or six times in succession out of 110 eggs set, but the same make of incubator in the room, when operated at 104 degrees, only hatched one or two chickens. There was a slight difference in two incubator cellars. Better results were obtained at high temperatures when the machines were operated in cool cellars.

Mr. DONOVAN: Do you infer from that last hen that the hen that lays the most eggs gives the biggest results in chickens?

A.—Oh, no. But I will tell you we are getting some interesting things as we follow along. We have some hens that are phenomenal layers, in that nearly every egg from them will produce a chicken. We have a hen that laid last year in seven months 110 eggs. I set about sixty of those eggs. They were all fertile, and no matter how I set the eggs, I would get a chicken that developed up to the eighteenth day; but I never got an egg to hatch. Hens that laid eggs that would not hatch last year are laying eggs that are not hatching this winter, and hens that laid eggs last summer that hatched are laying as good eggs this winter.

Mr. DONOVAN: I asked you that because the general supposition is that the hen that lays the most eggs will give you the least fertile chicks, because they are forced?

A.—I doubt that.

Mr. DONOVAN: What quality of chickens did you get from the last hen?

A.—They appeared all right. We hope to duplicate this work this season, and we shall endeavor to keep a record of each chick, as to its mother and the method of incubation.

The only comparison between wet and dry chickens that I can make is that the one appears full and plump, like an apple just pulled from a tree, whereas the dry chicks look like the apple that has been left exposed to the air for some time and is beginning to look wizened.

Mr. McNEIL: Don't you find a chicken that is hatched about from the nineteenth to the twentieth day, no matter how they are hatched, are all right?

A.—No; the best chickens we have ever had to live are the ones hatched in twenty-one days. I found in operating the incubators that when I could get an egg to hatch in twenty-one days it was all right.

Mr. McNEIL: A hen won't hatch in twenty-one days if she hatches right?

A.—We set about eighty hens and only two hens hatched under twenty-one days. One hen did not hatch a chicken for twenty-three days, and then she hatched 100 per cent.

Mr. DONOVAN: Were they good chickens?

A.—No.

Mr. BROWN: From your opinion you have come to the conclusion that fertility has nothing to do with the laying capacity of the hen?

A.—As far as I know it has not.

Mr. BROWN: That is the conclusion I came to.

Mr. DONOVAN: You said you did not care much about the size of the air space; you would qualify that with the minimum and maximum?

A.—Yes.

Q.—What is the maximum?

A.—I would not want eggs to evaporate more than 18 per cent. I did my best with three incubators to drown the chickens in the shell. We used moisture in the bottom and on the top, and the moisture was running down the sides, and that machine hatched exactly the same percentage as the one beside it running dry.

Mr. BLACK: How about the air that you passed in the machines?,

A.—The ventilation was the same, neither one given any special ventilation.

Q.—Did you get a good hatch?

A.—We got 80.2 in one, and the other 80.1 per cent.

Mr. BALDWIN: What time of the day did you take the temperature?

A.—Three times. We were guided by the morning and evening temperatures. In the middle of the day they would run up occasionally. Sometimes we took them oftener than that. Most of us that were running the machines lived for six months in the incubator room or in the field with the hens. An incubator thermometer sometimes hops up. I would rather see the thermometer go down than up. When it goes to 98 it does not worry me, but when it goes to 105 it does.

Q.—Do you open up the incubator to cool?

A.—Eggs are cooled on top of the machine or on a table.

Q.—What is the result if you operate an incubator with one of those wire gauze thermometers and determine the temperature with that?

A.—We have not used the thermometer in this way throughout the entire hatch, but have used it for a portion of the period.

Mr. NIX—What results?

A.—Results were all right with the wire gauze egg. The egg near its top registered 101½ degrees.

Q.—I should think you would get a different temperature where the thermometer touches the eggs?

A.—It is practically the same.

Mr. NIX: With the thermometer under the hen, it shows practically the same temperature from start to finish?

A.—It did.

Q.—It does not follow that the eggs under the hen were hotter than what was indicated in that thermometer?

A.—All we got under the hen was the air temperature.

Mr. NIX: Why is not that the right way to take the temperature in an incubator?

A.—I think that would be all right.

Mr. GRAHAM: We had some clinical thermometers for the purpose of taking the temperature, and we found them to register from 91 to 107 degrees. One hen that was the warmest on the top of the eggs was the coolest on the bottom.

Q.—How do you account for that? Do you mean on the same day?

A.—We had two thermometers in the nest at the same time—one 107 degrees and the other 91 degrees.

Q.—How do you account for that?

A.—I do not know how she did it.

Q.—Would every egg in the same machine indicate the same temperature?

A.—Yes, for the first week; but after that every egg has a temperature for itself.

Q.—How many degrees difference?

A.—I have had them vary about two degrees; that is where the advantage of a hanging thermometer comes in; after the animal heat in an egg begins to develop the temperatures vary.

Mr. DONOVAN: Suppose you reverse those eggs and take the eggs at the end of the machine; will that change the temperature of the individual eggs coming in contact?

A.—No; it did not. We marked some eggs under a hen and tried to watch how she turned them, and some of those eggs if you looked at them five minutes after, were in a different position; but one egg she never moved for four days; that was at the back of the nest.

Mr. BLACK: How did that hatch?

A.—She hatched them all.

Mr. Black: Do you know whether that one lived or not?

A.—I do not. We caught a hen laying out in the field, and we weighed the individual egg, and when she laid sixteen eggs she went broody, and we weighed the entire eggs and she sat on them. We took her temperature and humidity and carbon dioxide and everything, and we tested the eggs, but not one was fertile.

Q.—That proves that when she steals her nest she does not hatch chickens?

A.—She did not lay fertile eggs that time.

ORGANIZED AIDS TO AGRICULTURE.

By G. C. Creelman, President of the Ontario Agriculture College, Guelph.

It is always a privilege and a pleasure for me to have the opportunity of welcoming a new lot of agriculturists to the Ontario Agricultural College. We have so many and diversified interests represented at the College now through its various departments that, whether it be school teachers, poultry men, sheep men, or cheese men, or who ever they may be—in what ever activity of life they may be engaged—we are always pleased to see them here, and we are complimented that they find something here to interest them, though they come from the town or city or from the country.

I thought that to-night I would not dwell on the work of the Agricultural College, for the reason that I spoke on that subject when you were here before, and I knew there would be a number of our students present who would know as much as I do about it; and I thought I would not take up their time in listening to me on the subject they are familiar with; and while I shall say some things about the College, I want to speak more particularly on the organized effort in agriculture in the Province of Ontario. We are "the backbone of the country," as the politicians say, as they travel around the country just before election time; and I want to know to-night whether it is true—in this day of Cobalt, in this day of Yukon gold, and fishery wealth—whether the farmers are the backbone of the country. There are four natural sources of wealth in this country at the present time. There are first, the fisheries; second, the forests; third, the mines; and fourth, the soil and its productions.

The fisheries, important as they may be, we must pass over, because they are a small part as contributing to our national wealth.

We might speak a whole evening upon the subject of the forest. These forests of Canada are the most important asset possessed by any country on the face of the globe. The Scandinavian Peninsula and the Dominion of Canada are the only two countries of the world who have "wood to burn," to use the slang phrase. They are the only two countries that possess more wood than the people are able to use themselves, and while there are other countries exporting wood, they must import another kind to take its place. Having this forest wealth, we have a source of revenue which we will do well to husband a good deal better than some of our Legislatures think necessary. I want you from this time on, when you see articles with reference to timber, to stop for a moment and think how lumber has increased in price, and you will come to the conclusion that our timber interests and the lumber interests are very important. Our own carpenter astonished me this afternoon when I said I wanted a particular piece of work done. I said: "We don't want dressed pine or dressed oak for that job; it is too expensive. Buy ordinary hemlock," and he said, "Do you know that ordinary hemlock costs $4 a thousand more than it did this time last year, and it was $5 a thousand more last year than it was the year before that?" In Ontario there are millions of feet of this timber lying on the ground, and the bark alone taken off and shipped to the tanneries. Up in Simcoe, Muskoka, and Parry Sound, all through that country, millions of trees were cut down during the last twenty years, the bark was peeled off and taken away, and the trees left to rot. Aside from that, Canada is doing much for her timber and lumber condition, and I saw only to-day in the paper called *Canada* that thirty million dollars were now being paid out in wages in the timbering and lumbering industry of this country.

The third national asset I mentioned are the mines, and you have that product in mind, especially those who come from the large centers—Montreal and Toronto or Ottawa, where the Cobalt fever has broken out, or, I might say, set in—because so many persons seem to have gotten that disease, and it has grown worse and worse as days go by, till now some are past redemption so far as getting back to legitimate business matters is concerned. In Ottawa, more particularly, we find young men quitting business and going off to Cobalt—even quitting the Civil Service, a thing that has rarely been heard of before—so wild are they about that new country. And so the mines in Ontario, particularly at this time, are a great source of national wealth. But the mines and the forests and the fisheries are all exhaustible. The forests must be replanted, the mines cannot be restocked, and the lakes must be supplied with fresh fish if you are to keep up a constant supply; whereas you can go on, year after year, cropping your soil, and, as a matter of fact, in the Province of Ontario to-day we are producing more bushels of oats and more tons of hay on the same acreage than ever before. We are selling more cattle and selling more grain per hundred acres than we did when it was cleared a few years ago. This is true, and it is for that reason that I wanted to tell you to-night something about the agencies that have been instrumental in bringing about this state of affairs. It is a remarkable thing that the average farm throughout the length and breadth of the Province produces more than it ever did before, by virtue of better methods of cultivation, by the careful spraying, picking, packing, and handling of our fruits, by the growing of better grain crops, and by the knowledge of what animal to put in to eat up those crops to better advantage, etc. And so during the last five or six years we have completely doubled the output of the ordinary farm, while in the United States and other new countries the condition of things has been entirely different. In wheat the average yield per acre is less than thirteen bushels throughout that country, and in Canada it is about twenty bushels.

I want to dwell upon one or two things that have helped in this development. I might first, very modestly I hope, take credit to the Ontario Agricultural College and the Experimental Farm on which this College is located, for some credit for these results that I have briefly enumerated. I want to say to those who are not familiar with the College something about what we are doing. In the first place, for the boys we have a long course and a number of short courses. Any student may come here and stay two weeks or four years. If at the end of two years he must leave, arrangements are made that he can get a diploma showing that he has a practical knowledge of those things that we teach. If he can stay longer, or by virtue of the fact that his people have retired and moved into the city, or for other of a dozen reasons, he finds that after the two years he is not wanted at home, he stays on two years longer and take his degree. So, out of 100 boys about 80 out of the first year come back. For our third year about 60 per cent. return. A number go through the four years because they think two years is too short a time to master the great science of agriculture

You cannot tell in farming what it is going to cost you to raise a bushel of wheat or what it is going to cost you to take off a ton of timothy, because you do not know how much nourishment is taken from the soil or how much has been retained in the soil for the next year's crop; whereas in business the manufacturer of a wagon, when he knows the price of hickory, knows the price of iron, and knows the cost of labor and knows what his plant is worth, can tell exactly to the cent what he must sell that wagon for to make decent interest on his investment. He knows that in advance, because he buys everything before he makes up the implement. On the other hand, the farmer has to work more or less from hand to mouth, in the dark, to a large extent. He has to go along the line of general principles only; but fortunately agricultural science has developed to the place where certain well defined rules have been laid down, which, when followed, will bring about certain results; and so it will need to be thrown back upon Providence and dry weather in case he does not get a maximum crop. Certain broad principles, certain common sense rules, have, however, been laid down in farming; and because we cannot control all conditions there is more reason that a boy who is going through for two or four years must get as far as possible a thorough grasp of all the known conditions so that he may control them, as far as possible, and thereby direct his farming operations along such general channels that general results may be expected. In addition we have a short course in poultry husbandry, which has been so successfully conducted here. There is a short course in seed and stock judging, where we had 300 students; some old men over 60 years of age come for two weeks and take in the judging, so that they may keep pace with the times and know as much as anybody in their locality in reference to the business in which they are engaged. There is a longer course in dairying, and we have forty students this year who are preparing themselves especially for the business of dairying, the milk supply, and the butter and the cheese as manufactured in our factories.

We have also a class for girls, and I want to dwell upon that more particularly. You will all have the privilege of going through Macdonald Institute and Macdonald Hall. We do hope, as the years go by, to take from the farm homes an increasingly large number of girls, who will come to the Institute, where there are no frills and flounces, and where we confine our time to teaching useful things, the three things which the girl must know if she is ever to be a housekeeper—how to cook, how to sew, and how to do laundry work. Those three things she must do, poor girl, all the rest of her life. No matter in what station she may find herself, one or two or all three of these things have to be done every day by our women. So why should not our girls be taught them from the first? Housework becomes very monotonous if not done well, and if things are not in shape they cannot be done with the best methods. They can be done with so much more cheerfulness if the girl knows the right methods. Macdonald Institute is the place for all sensible girls to go to learn to do those things in the shortest possible time. We have a short course of three months for girls, which costs $60, and a longer course for housekeeping for nine months, costing $180. During that time they can learn something else, perhaps chemistry and perhaps biology, and so become better informed women, who have a broader understanding of the whole principles of housekeeping and home-making. The two years' course is one of the most important, because it has a future bearing on the life of many persons. That is our two years' course in Normal work—training teachers for domestic science subjects. I have no patience any longer with the trustees of our ordinary schools who do not rise up and insist upon these things being put in the rural schools and the town schools' curicula. I have no patience with schools that will not put in manual training for the boys, the general knowledge which goes to make a person familiar with the things immediately about them; and for the girls, as small as you can get them, just the little tots, just as they are fond of their dolls and dress them and are kind to them, so they will take just as naturally to the work of domestic science. Good men and good women have given their word that it is successful in their schools, and I have no patience with the schools that do not take it up. We prepare teachers with two years' training, that they may be able to go out into the schools and teach these things to the child when the child's time is not worth very much. The children become very important citizens when they are big enough to do a man's work. It did not use to be so. It used to be you could hire a woman for 50 cents a day and a man for $1 a day; but now we pay a man who has no special knowledge of the work—an ordinary man—$2 a day, and scrub-women $1 a day. And so I say that things of practical value, particularly for girls, they must be taught while still in the public school. Those things, if they are going to get them at all, and if they want to reach the great body of our men and women, must be gotten at when they are young, when their time is not worth very much.

The second item I will mention is the Experimental Union. That is an organization composed of ex-students and affiliated with the department of field husbandry. They have 4,050 agriculturists, farmers on their own farms, who are conducting experiments and sending their results to Mr. Zavitz, so that he can tell what is being done in the Province and what may be done. That is a very important branch, and it has had the effect of strengthening our work throughout the length and breadth of this land. These 4,050 farmers make up an army of agricultural soldiers who, in their own townships, are doing something to leaven the lump, and increase not only their own crops, but, by virtue of example, are informing their less fortunate neighbors that something may be done to increase the yield of farm crops by better seed selection, by planting other varieties than those they are growing, or by changing their methods of cultivation, as suggested by the Experimental Union.

I might say that the Agricultural College spent last year the sum of $129,042, the Experimental Union $2,500 in their particular work, and the Farmer's Institute, in the year 1906, spent $26,812.

There was a time when the professors of this College did all the Farmers' Institute work that was done. It simply meant that the farmers met together in school houses or township halls or in a little room by themselves to thresh out those subjects in which they were most interested. The movement started by a few of the professors of this College in 1885 going out and giving talks to the farmers, and all those that came were benefited to some extent, but they found out that there was such a demand for these meetings that they would not have time for their own work at home. Last year the Institute held 800 meetings to which the Ontario Department of Agriculture sent special speakers on special topics in which the farmers were interested, and so there are Farmers' Institutes all over the country and they are holding meetings to-night in Grey, Oxford, Wellington, Simcoe, Glengarry and Stormont, and all over the country. Every year these meetings are being held over and over again. They have been doing the direct work of carrying the good news to the people. No one agent has done so much to take information to the people and give it directly by word of mouth than the Farmers' Institute, and they have done so much to bring about the improved condition of things on the farm that we find in the Province of Ontario to-day. There are also live stock associations, such as the Horse Breeders', Swine Breeders', Cattle Breeders', Sheep Breeders', Shorthorn, Hereford, Galloway, Jersey, Ayrshire, and Holstein, for with the dairy cattle we get down to individual breed associations. So live stock, from the horses down to the pigs, have been very important, from the fact that, notwithstanding how much this College or this Farm may have done to increase the bushels per acre, it would be all lost were it not that another class of individuals—the live stock men—have been breeding and distributing a class of live stock that will take this food that has been produced and make of it the highest proportion of high priced meat. That is why many times when I have been asked by students why in the fourth year we cannot have an agronomy option and a live stock option, I fight shy of that, because I do not want to turn out specialists in one thing when they should know something also about the other. I believe that every student graduate from the Agricultural College in agronomy should know not only how to grow the feed, but also how to select animals of the breed which will sell for the most money.

Another branch in which I am not very clear as to the far-reaching effect for the money spent is that of our Agricultural Societies or Fall Fairs. The Government spent last year $95,000 in cheques sent directly to these fall fairs, that they might hold the exhibition where the farmers may come in and see the very best of everything shown in the very best style, and put in such shape that they will go home and say, "I have seen something to-day that I am going to try and imitate." If the exhibits were always true, it would be well, but too often the boys go back and say, "Look here; I will have to sell our horse; it is too slow. I saw a horse travelling at 2.30 down there, and that is what we must have here." Hard-headed farmers' boys don't say that, but yet if they just see the horse race and nothing more, they are not very much elevated; and perhaps the horses in that race were old skates brought in from some city for the purpose of carrying away some of that $95,000 that was given by the Government, and some people say that the $95,000 is not spent to the best advantage. In some places the money is spent to good advantage where they have an entirely educational exhibition, and where some of the directors go through the country between fairs and stir up the farmers to make a good exhibition. The fall fair should be an occasion also where the farmers can meet together, put down their reaping hook, and put down everything they are doing and go and meet their friends at the fair grounds, and there they see the best product of the field and the garden and the orchard, and then go home after visiting their friends and say that the visit was well worth the while if it was only for the social intercourse.

Probably one of the most important items of expense last year in connection with the Department of Agriculture was the sum of $53,200 spent for dairying work. That is a lot of money, and some of you men may be surprised to find that the Dairy Department spent $53,200. In all lines of progress dairying has leaped to the front, and has made a reputation for Canada in the markets of the world. When I say that three of our products —butter, bacon, and cheese—in 1906 brought more than $40,000,000 in hard cash for the farmers of Canada in the markets of the Old World alone, then $53,000 for instruction looks small. I want to tell you what has been done in the last year or two. It is not easy to keep our products A1 in competition with the markets of the world. A few years ago the people would not eat our cheese. We made some good and some very poor stuff, but to-day we make practically no inferior cheese, and I think Prof. Robertson and our Provincial Dairy Schools should be given the credit for starting this new movement. When he became dairy expert for the Dominion of Canada, Prof. Robertson advocated instruction in cheese factories everywhere, and now we have about 1,500 cheese factories making cheese in the Province of Ontario alone. After a time it was found that they were going back a little in some places; some flavors seemed to get into the milk, and we were just afraid that something might happen to the cheese industry. Ontario then hired men at $75 a month and $100 a month, and put thirty-five of these men out, expert dairymen, men who simply took a horse and buggy and drove around from factory to factory and tried to check anything that looked like improper methods of cheese making. They gave instructions, and went into the factories and helped the cheese makers make their cheese and showed them how to overcome difficulties. They went about on the lookout for injurious flavors or anything that would cause our cheese to get a bad reputation abroad. These men are acting in your interests and mine, because if anything should happen to the cheese industry in this country, Ontario would nearly go bankrupt. You cannot take $30,000,000 out of this Province and drop it into Lake Ontario without putting people out of business all along the lines; and so it is most important that this money should be spent for these purposes of instruction. The Province of Ontario spent for agriculture last year a total of $445,000, voted directly by the Government for the upbuilding of agriculture, and to help your people to bigger things, and yet I think we are getting, as a Government, good interest on the money when our annual output has gone up in the last twelve or fifteen years from $150,000,000 to nearly $300,000,000. That is the value of the farm products each year from the farms of Ontario alone. Well may $100,000 be spent if it is going to bring $5,000,000. I have taken time only to mention a few factors that have contributed to bring about these results. Many other agencies have helped very materially, the more intelligent interest that is being taken in poultry culture being one of the most noticeable.

Farm buildings, the farm implements, and the farm live stock are now valued by the assessors in the Province of Ontario at more than a billion dollars. Hence I say, in conclusion, we are in a business in which we need not be ashamed, because it is the biggest business in one of the best favored lands under the sun.

Mr. Baldwin: I know we have appreciated very much the interesting remarks that have been given by Mr. Creelman, and they ought to make us feel proud of the Province we live in. There is a great deal of truth in what President Creelman has said with regard to the agricultural interests in the Province. I know it has occasionally been my duty to travel through the country districts, and it seems rather pathetic to go through the farming districts and find the farmers growing old in years, and you wonder where the young people have gone to. They are suffering there for the want of real assistance, and the young man is attracted to the city, or possibly to the great west, where the excitement in the great wheat growing country is attracting them, and one wonders a bit what attractions has the city against the country. After all, I think there is really no comparison. We know that the profession of the farmer is a very high one; there is no profession that can beat it, and the Agriculture College, I am sure, is doing a great deal to improve those farming conditions of the Province. I think a great many young men are attracted to the cities because of city life; but if you can get the young men interested in the improved farming conditions they will not then be attracted to the cities. I am sure the Agriculture College has done a great deal to advance agriculture, and so it should attract our young men to stick closer to the farms. There is no doubt in my mind that a great deal of difficulty has been on the social side of farm life—that the life had not been as sympathetic in domestic economy as it should.

The work that the Macdonald Institute is doing is going to revolutionize the farm life. It will make the farm life happier for the girls and young women, and happier for the young men. With improved sanitary conditions, introducing water with proper drainage so that you do not have to pump at the well; with the opportunity of having gas provided in your house—all these advantages, together with the teaching of domestic science, will help to make farm life more pleasant. As a poultry man, I would like to say that we appreciate very much Prof. Creelman's very sympathetic interest in our work. We appreciate the interest shown in the way he is aiding and helping in the practical experiments that are being made by his very capable lieutenant, Mr. Graham, and I want to say to them publicly that we appreciate very much the time and energy they are spending to help us out of these difficulties, and we wish them every success. I am sure that the interest and intelligence that they show, and the perseverence they have given to the work, will solve some of our problems for us.

ILLUSTRATED LECTURE.

By J. E. Rice, Cornell University, Ithaca, N.Y.

The following remarks are taken from running comment made by Mr. Rice upon stereopticon views from slides carefully selected by him as being of practical interest. He said: I have a good many slides this evening, and therefore will have to pass rapidly over them rather than take much time in discussing them. This first slide represents the brooder indoors, which Mr. Cyphers and Mr. Nix spoke about this morning. It was a photograph taken on Mr. Cypher's model farm, and shows the different tiers as they were arranged. In the first house he built he had five. He has since changed it, so that there will only be three. The new plan is to make these a little higher, giving the larger runs for the chickens as they grow older, thus mixing together the largest possible number of chickens within a limited area. It worked all right for a short time, but it is too cramped, and they are kept too much in a sameness of temperature for their good.

The next illustration represents a type of raising poultry by the outdoor system of individual brooders, and was taken on one of the large farms in New York, where a man has been successful in raising chickens this way. It does not appeal to me in the way he is using it. He has all the yards divided off and the brooders in an individual yard with high fences, making it a fixed affair, and it always seemed to me that one of the great weaknesses in our methods of raising chickens and keeping poultry has been that we have tried to keep them on the same land too continuously. I believe they should be moved to new land every year. This pretty nearly fixed the thing, and I believe they have been there for several years.

The Chairman: What time of year?

A.—They stayed in that position the year round. I was visiting with a class before the snow came on, and they shut the winter conditions out. In front you find a little shelter. The feeding is done at a point where it is shady, and the chickens come there. There is a multitude of work attending upon opening and shutting the gates and passing from one place to another with so many brooders with fifty chickens in.

This is a picture taken on the model poultry farm a few days after they moved from Wayland, and represents one of the types of brooders scattered among tht trees in the grass, giving the chickens the natural conditions that art necessary for vitality.

This shows a little different plan, where the chickens are running in a large park, and at the time the picture was taken they were raised on these little brooders, and we began to use a kerosene heater in these hovers, with fifty chickens in, and found we could keep two hundred chickens there as well as fifty. We built a colony house 6x7 feet, and now we are building them 8x8 feet. Another picture will show the same orchard four or five years later, the size of the trees, and the number of the houses with the kerosene heaters. We sold $500 worth of plums off that orchard.

I am showing you a series of views of keeping poultry. I think it is essential to have the sexes separated early, and have the males in a place by themselves and cull off; keep the best for breeders, and give them the best range they can get. Here is a fresh air house and colony house, from which the chickens are taken to and from the brooders and brought over here when they are able to get along without any heat, and these houses are arranged on a large area. The chickens are placed in there long enough so that they become acquainted with it, and after a few days they will know their own house and come back from the common park. This was taken on Mr. C. H. Wycoff's farm. This works very successfully, and I noticed that this last year he has modified his plant and has moved those brooders from the fence.

This is a picture taken on the Cypher's incubator plant, showing the types of houses they are using for the same general purposes. It seems the houses are too close together for the purpose they were intended. The colony houses ought to be far enough apart so that they can get the benefit of a colony plan.

This was taken from the Gidney farm at White Plains, of which Mr. English is the owner. This is where a very wealthy man makes his money out of some corporate interests and is spending it in wealthy farm living. He is raising everything in the very best way, and he has means to supply everything. His eggs are shipped to his yacht every summer.

This is taken from one of the large plants in the States showing the type of building, which it seems to me is costing rather too much. It is Mr. Kellar's building. He never had told me what they cost. He has led me to believe that the cost was between $4 and $6 per hen capacity. The houses are extremely large, but the windows are rather small. He has elevated his house two feet on a stone foundation above the ground.

Q.—Is the air sufficient for the pressure?

A.—Not enough. He has stuffed it with straw, and he has rather an extensive roof.

Q.—What is the object of the stone foundation?

A.—He did not want his floors to rot. He had board floors. He sold the whole thing out to a most excellent advantage for cash, and after two or three years came back to the poultry business and picked out a situation which was very fine in many respects. He, however, provided for the mistake he made in the old houses, where he built them near the ground with hemlock floors, and after six years they were not safe to walk on; so he built these up with that purpose in view.

Do not have too many fences for hens. Give them a good run and they will come back to their own places.

This is a picture on a farm where, instead of having fences, five or six hundred chickens run in one apple orchard, and at night they all go back into their own particular pens. They are in pens of thirty-five or more.

Q.—Do you discover any serious difficulty in crowding?

A.—No, we never have; and we have never found any difficulty with the hens getting mixed up. I must say we made a mistake in building that plant that way. These houses are all too close together, and the hens are in a flock of six hundred; it would have been wiser if we had placed the houses twice as wide apart.

Q.—How wide?

A.—Fifty or seventy-five feet, and we did not have a system of double yards. I believe that with a commercial plant there should be an opportunity to change from the north to the south or east to the west, giving the land an opportunity to grow some crop. If there is one thing that has worked to the detriment and failure of the poultryman generally throughout the country I believe it is congestion of the poultry business on a limited area. If I were to start to-day I would never make that mistake again. They ought to have more land and keep the hens off one part till it is rested up.

My partner built that house since I moved to the farm, and it cost him 75 cents for each hen capacity. There is no glass, which I think is a mistake. There is all oilcloth there, but quite an opening for the sunlight to pass through. The foundation is of stone, then all over we have an interior of stone walls, and there is a cement floor inside and cement over the top of these stones as they are laid in there. There is only one thickness of boards, and that is hemlock, and the framework is made of oak that was sawed out in various lengths. It was wood that was left from the building, and in that way he got a cheap house, and he says he is getting excellent results from it.

Here is a picture of one of the famous poultry farms in Connecticut. Mr. Tillinghast is a man who does not know how many hens he has, nor does anybody else, and how much he makes he does not tell. His methods are so revolutionary in their nature that I would not think of recommending them. I think he could get better results if he did his work a little more carefully. He goes to the far extreme of economy in labor, and to the very limit of danger in the matter of neglecting things, and yet his only one hope of success is the fact that his houses are so loose, as well as his methods, that his hens are living in the natural conditions as much as they can and still be owned by man. I do not want to go into details there. I do not think he cleans out more than once a year. He starts in to clean one-half the house one year and the other half the next year. He feeds practically only two things—one is wheat screenings, which he buys by the car load, and the other meat scrap, with some corn.

Here is the Haywood poultry plant, which is famous in a way. I went a good deal out of my way and spent quite a bit of time and money last Thanksgiving Day to visit the poultry farm that claimed to have 7,000 hens, and when I got there I found he had nearly 9,000. He had more than was claimed; but his methods are more revolutionary in a way than Mr. Tillinghast, and he has these fowls scattered in about 700 houses. This shows only one colony.

Mr. Baldwin: Are those houses for the laying stock?

A.—He did not have anything else.

Q.—Any fences?

A.—Absolutely no fences; his hens did not run out at all. Mr. Haywood, of Hancock, N.H., is running this farm, and he is simply taking the cream of the poultry business, and he is using all the vitality there is. He says he is lazy. He is shrewd enough to let the other fellow take all the risk, and he takes the thing that has the least possible risk, and he is certainly making money. He has been at it thirty years.

Q.—Where does he buy the stock from?

A.—He buys from all over the east. He prefers Maine and New Hampshire stock from anything else he has got there. He has a house eight feet square, with nothing but wire in front; there is no cloth or glass, and he puts fifteen pullets in each of these houses. There is a water bucket, and they reach out through the wire to drink, and he feeds the hens with the hopper. He has one box with soft food and grain and oyster shells, charcoal, and meat scrap, and he keeps it by the hens all the time. He buys the hens at 13 cents a pound alive and puts them in there, and keeps them there till one year has elapsed, feeding them green feed in the summer time, but never letting them out; he gathers the eggs and sells them; and in the fall of the year, along about September, when the price of live poultry is the highest, he sells out the whole bunch as fast as he can, cleans his house, and begins to get ready for the new stock. He cleans his house twice a year, and the hens look to be perfectly healthy. He says that he scarcely ever loses a fowl either by stealing or by death. None of these houses were locked, and they are scattered a mile and a half in one direction and a half in the other.

Q.—Why not put those houses close together?

A.—He says he has experimented, and he likes them better that way. They are all a certain distance apart; I think he said fifteen feet. Most of his houses he has shingled, and on some he has used galvanized iron. He has galvanized iron eave troughs that collect the water and bring it down to this trough; he has another trough that he fills with grain.

Q.—Has he any particular breed?

A.—No; he says he gets anything he can that is strong and vigorous.

Q.—What is egg production?

A.—As I recollect it, he gets no eggs at all till January. He told me he gets about 100 eggs per hen, or a little more than that. He sells the fowl for a trifle more than what he actually paid for them, and he has his labor for very little. I heard he was a novice in the business, but when I looked at him I made up my mind that he knew what he was talking about. He was a shrewd Yankee, with steel-gray eyes. He carried great lots of fancy poultry of different varieties in his days, and had been at it for twenty-five or thirty years. He has been winning in different shows, raising by the different methods of hatching and brooding; but he made a failure of it in the end, and he said that hereafter he was going to do the easy thing and let the people in Portland and in Massachusetts do the risky part of it. He forces the birds all he can, and then gets rid of them before they die.

Q.—He must have a good many men working for him?

A.—He has twelve men, and in addition to his hens he has ten thousand apple trees. Every farm he buys he puts out in apple trees.

Q.—I understand the normal mortality was 10 per cent.?

A.—The normal mortality was 2 or 3 per cent. I understand he lost whole shipments of hundreds of hens some years because they cannot stand his conditions. I asked him what kind of birds he liked to see come in, and he said of all kinds of fowl he has ever seen he liked the Barred Plymouth Rock.

Here is an original type of a hen house. Over at Addison is a man by the name of Mason, and he built a house sixteen or eighteen feet wide, double boarded and divided off in pens fifteen feet deep, with doors that swing both ways, with a passageway through, and he found by opening these wire doors and letting the hens go visiting, having free range and coming back to their own compartments to lay, that he could get just as good production as he could when he had them separated in their pens. He succeeded with that house for two or three years, and then he built another one. In this house he has 500 Leghorn hens in one flock. Since I took these pictures the house has been burned down, and he has built on the foundation another house like the last. It has the same kind of windows on the north, and the hens working in the litter. Clear around the room is a steel trough, and the soft food is put in there. There are three tiers of nests and some ventilator shafts. The house is ceiled, and it is exceedingly damp. The doors will open and shut into the roosting compartments. Strange to say, he was afraid when he started in on that plan that the hens would drive each other out of their place, and he drove stakes in between each hen so that they should not crowd; but I told him not to do that because he would injure the birds.

There is one thing I would like to draw your attention to, and something we have been using for the first time and like very much, and that is the way to keep the roosting compartment warm, and not have to resort to the double dead air space, or have it too stuffed up with straw, and this is accomplishel by having the air pass up at these points behind the perches, having an opening in the plate, and the air passing up between the rafters so that there is a perfect circulation of air around and behind that center lining, thus keeping it very much warmer than it would be with the dead air space or having it stuffed with straw.

Q.—What is gained by not having that in a dead air space behind the roost?

A.—I have not seen this in use, but it seems to me to be reasonable. It does work if you make that tight so as to get a dead air space, and that air coming in is cold by coming in contact with outside boards. If you stuff it with straw it gets cold, too.

This is the front of the house. The house is boarded on all sides except the south, and for instruction purposes we had the student each have a pen. We decided we did not want one student going in another student's pen. The house provides for cloth, and there are glass windows straight up and down to throw the light up. I think a glass window should never be higher than six or eight feet at the top, but the north window should be high above the ground, to prevent wind from driving in and striking the hens. We keep the glass windows closed to let the sun strike in, and still the wind cannot drive through.

It is an effort to find out how to give a dust bath, without having the dust flying through the air all the time. A dust wallow is an essential thing, for we have found that hens without a dusty wallow will become lousy very quickly, but by giving a wallow they can become completely rid of the vermin. The wallow must be in a place that is warm and dry and sunny, so for that reason we put a lower sash in these glass windows before the house was finished. We prepared for this by making a frame at this point and sinking the wall into the cement floor about eight inches deep, and we could fill that opening up here, shovelling from the wagons; so you see we could do all the work from the front shovelling out and throwing in. There is a wire in front of the window, and we can let it up when we like. On the outside there is an incline leading from the window down to the floor which covers it, and the hens come from a little opening in the curtain, so there is the least possible dust in the house, and there is less dust than if the wallow was in the ordinary doses. We had difficulty with the house being very hot in the summer, so we simply put this little opening at the top to let the hot air out.

Here is a raised house, showing the house on runners a foot high. I was opposed to it at first because it seemed that the chickens would have to run up too far, but I like it now, and the chickens have an excellent place to get shade, and another advantage is that the house is up so high that rats or any other kind of vermin do not find a place to get in. There is difficulty getting up into this house, because we raised the sill of the door a few inches above the floor in order to keep the older chickens from flying out.

We use these houses the year around, and each has fifteen pullets in it, and they have been running through the winter. It takes 5 cents a day to operate one of these houses with gasoline with 200 chicks in it. I do not like the windows. We have tried two or three methods to get the windows right. These windows let too much heat in in the summer. The window is fastened at the top and every time you open it up you are apt to break it.

Q.—Have you ever tried whitewashing the windows?

A.—We do that, but it looks bad.

Q.—Why not face the houses to the north?

A.—That is a good idea; another year we are going to try it and see how it works.

Q.—Don't you have trouble with having the laying hens in there in the summer time and the little chickens in there in the winter time?

A.—We would do that only we have not enough land at the University. This is where they are building the first "A" house out of shredded wheat boxes. We pay from 12 to 15 cents apiece for them, and a house eight feet square with four rafters will take three of these. Three shredded wheat boxes will cut to advantage, and with good roofing paper—red—for the top, it makes a good, serviceable house. Just to show you how people will take to an original idea, we thought we had got something there that would bring credit to the University on account of the small amount of material it took, and after getting it up and thinking it was an original discovery, we found that this man Henwood had been building them for thirty years up in New Hampshire.

This shows a house eight feet square, representing a trap in the floor holding the litter. The litter is lifted up and the trap comes down. We are using it this winter for egg production.

This represents the method of putting in the material. The University gave us the filtration plant. It is a copper building, with everything in it copper. It was formerly used by the physics department for carrying on their electric tests. It cost us $29 to move it and build it, and we have $150 worth of lumber from the transaction.

Q.—Have you any difficulty with the gasoline heater?

A.—We have changed the heater several times.

Q.—What kind of paper do you use?

A.—Red roofing paper. These chickens have a good, big range. If land would permit, we would have those colony houses on runners, and they could be moved without taking the chickens. The houses we had for surplus stock are entirely wire in front. We have a cloth curtain that rests up against the roof.

Here is another colony house and a much easier one to build. It costs a little bit more, but having the advantage of being a better house for the hens in the winter, though not so good for the chickens in the summer, for the reason of having to keep the gasoline tank there, and we must have it up high to make it work.

Q.—Do you find it necessary to keep the tank in the shade all the time?

A.—Yes, with gasoline. I think it was first suggested to me by a young man in Cornell University by the name of Graham. He said that he had used it, and he promised to come down and show how to make a heater; he did so, but his heater was a failure. We made a heater of our own, and the thing has gradually worked out. We started by having a one gallon oil tank, and it was in the sun and the oil evaporated; it went down in the pipes and put out our lamps, so we remedied that by putting it in the shade.

We have been running an experiment for three winters on the effect of glass or cloth windows. This is a section with glass, and the other is with the cloth. The other one was with one half cloth and the other half glass, and the other one without any cloth or glass —just a wire in front—and we have been keeping atmosphere records and sun records with seventeen brown Leghorn pullets in each house. The results up to date are complete with last year's work. Last year we got a good deal better production in the house with the cloths. This year we did not find any difference between the one with the glass and the one with the cloth. The houses that had the glass and the cloth have been better than the ones in the open. I saw before I came away the Chemist's report as to the moisture in the straw. We gathered up the straw from each of those houses, weighing it when it went in dry and weighing it when it came out wet. The Chemist's report was in this order: The first had by far the most moisture in it; the glass was next, and the half glass and half cloth was next, and the one with the wire front was a good deal drier than the other. We find twice as much sunlight in the house with the glass as we did with the one having cloth, and more in the one with wire than we did with the other two. The one with the wire gets even more sunlight than the ones with the glass. The actual difference in temperature between those houses is between 6 to 8 degrees, depending on the winter.

After showing illustrations of incubators, the lecturer proceeded: This is the first picture of the moulting experiment, and here is the first chicken that enabled Miss Nixon to be able to say that she knew where the first feathers came from. This is the way the feathers first develop.

This is the chicken that Miss Nixon used in trying to find out whether it is true that the wings of the sickly chickens grow excessively large in proportion to the bodies.

This is one of the hens that was put in diamond dyes, and shows how the feathers were molted at this point. This is one of the pullets that laid first; she laid about twenty-nine eggs, when she began moulting. This is the same hen, showing by the colored feathers the ones that were still left while the body feathers had pretty nearly all changed place. This is the same hen, showing that where feathers were moulted on one side the same feathers disappeared on the other side, and that the last feathers to be moulted are the primary feathers. At the close the feathers were growing in there up to November and December. This is a hen with the primary feathers; tail feathers gone, almost all the body feathers gone, and the new pin feathers coming in all over the body. This is not a natural moult. This is the same hen, held up to view, showing how the feathers disappeared on the body.

This is the picture of the litter in a house, and shows the retarded or starved hens, and over here the forced hens. Can you see that there are any more feathers on one side that on the other. These were dipped in the diamond dye. This is the picture of the straw on the floor, showing the retarded hen and the forced hen. These hens were starved four weeks, only given about half their usual ration, and these others were fed the same ration that they had been getting right along.

This shows a picture of the hen that laid the 225 eggs, beginning the 24th of January. She laid the first day the trap nests were put in, and continued to lay 225 eggs in the ten months.

Q.—Did you ever notice whether she had a big crop or a small one?

A.—Not very large. She travels on her record.

Mr. **Graham**: She is a Dorking in type; long in the keel.

Mr. **Baldwin**: You wouldn't say she had much posterior?

A.—No, but she gets there just the same. She is one of the long type. The food has further to go, and you get more eggs. This is the same hen; you see the new tail feathers going and her body feathers just coming in. Those are the primary wing feathers showing the diamond dyes.

Mr. **Graham**: What are the best dyes?

A.—The purple and buff dyes or colors; the blues did not stay at all.

Q.—What kind did you use, the cotton one or the silk?

A.—I do not know. Miss Nixon knew more about it, and she got the ones she thought were the best colors.

Q.—Couldn't you dye the white chickens black?

A.—I think so. This is the grit experiment. The birds' runs were made so that they could get to the ground, and they were always hunting for something they could not get. This shows the hens eating the eggs. Roosters in it, too.

Q.—What time of the year was this?

A.—This was taken in midsummer; they were in the experiment about eight months. The experiment ran eleven months, and those hens ate every egg they laid.

Q.—When did you feed them? Did you feed them at all? (Laughter.)

A.—They were fed on grain and soft food, the same as the other hens, with the exception that they did not get oyster shells, and they were anxious to get lime to make the egg shell. They laid fairly well at first, and of all the eggs we put in the incubators we never succeeded in hatching one; the lime had injured the hatching qualities.

In pen "C," where they had grit, you would say they were in the lowest state of vitality at the end of the eleven months' experiments, notwithstanding that we found considerable fat on their bodies.

In pen "D" they had the powdered grit. The experiment was started for the purpose of finding out whether the grinding material was necessary or not, but we found that lack of lime spoiled that observation.

Q.—Did you incubate the eggs?

A.—We incubated the eggs in both pens, and we never hatched one egg out of the twelve started in pen "D." None of them died out of the twelve. We started and gave them grit, and seven out of the twelve died. They took five from each pen, and we left six pullets in this other pen that we did not kill. We took the same number to compare with the six we saved. From this pen that for eleven months had not any grinding material nor any lime at all, when we gave them oyster shells they picked right up; they began to lay, and continued to lay, and have never eaten an egg.

I took from the one pen fifteen of the fattest hens in the lot and the three leanest in the lot, and right under here shows the ovaries and the condition of the egg; there is an egg with the shell on, and the ovaries. Here are the three leanest of the bunch fed in the same way, and yet these hens had a little extra fat on their bodies, but they were lean compared with those that were extremely fat. I am not going to say that a person wants to keep a hen in an extremely fat condition to have her lay. If we want a good layer we must have a strong hen. The heaviest a hen is in her life is just before she begins to lay, and she gets light as she continues laying. You have heard it is possible for a hen to re-absorb an egg or the yolk of an egg after it was once in laying condition, and then not continue to lay. I do not think this is a positive proof, but it looks as if we had good reason to believe it. I find in almost all cases that when a hen is in a laying condition and is a good layer that the ovaries are shrunken. I have seen chickens with an ulcer on the liver. This is a simple coincidence in three white chickens. Sisters that stole their nests side by side, and the eggs incubated at the same day, and that hatched thirty-eight ducklings out of thirty-nine eggs.

Q.—Did you ever try those eggs in the incubator?

A.—I have never succeeded. This is a picture of the family of ducks out for a stroll, and they used to be together all the time. They did not associate with ordinary ducks.

This is Black Beauty on the day she laid her one hundred and first egg, beginning when she was 4 months and 6 days old, and has continued laying those eggs without skipping only two or three days at a time. The eggs are being weighed right along, so we keep the record. They weighed about two ounces. I think she deserved the credit of going down through history with the results of her labors at her side.

Let me give just a few statistics showing the relative comparison of value of the poultry produce in each State. The order in which the States run is: Ohio, Iowa, Pennsylvania, Illinois, New York, Mississippi, Indiana, and Kansas.

This is the result of a census we took, in order to find out what the different States were doing in poultry husbandry, and we are going to take it up in a committee to see just what is being done. In some big States, with poultry values in the hundreds of thousands of dollars, there is nothing doing in the colleges or experimental stations.

Kentucky is doing very little. Maine exceeds any other State chiefly in the matter of building stock and equipment. Nebraska has no poultry department; Rhode Island did not get the report in in time to have it put on the slide, and I had to estimate that. The State poultry buildings in New York are worth $6,500. I think ours cost $7,000 or $7,500. Maine has the largest, $9,400; Iowa, $7,000. They have twenty acres of ground devoted to poultry. Maine has thirty-five, and Cornell only two or three acres devoted to it.

In the United States there are over $500,000,000 worth of poultry and eggs produced every year, and only $75,000 are spent in assisting the industry. I think it is about time that the poultry men made it known that they have just as hard problems to solve as other branches of agriculture, and I want to say of the Directors of the Colleges that as a rule the men are only too anxious to do the thing that will be of the most value to their people. They are honest, hard workers, and painstaking men, and the only reason why they have not recognized poultry is because they thought a hen is a little bit of a thing, and they never begin to think how all the little hens all over the country could bring so much to them; and the only reason why they have not carried this through as they have the dairy industry, or horticulture, or any other, is because they thought it could not be done successfully. There are a few of the States that are trying to work this problem as best they can. We have not begun to fully investigate the subject; we are only practising. But if a few of us will demonstrate that this is an important thing, and that it ought to be investigated, you will find that the States and Provinces all over will take this thing up carefully and carry it right through. (Applause.) I want to say that, so far as I know, two of the men who stand up the most in fostering this thing are your President here and Dean Bailey, of Cornell University.

This picture shows the boys doing the actual things. Here are the boys with the boxes of straw going round to the different houses in the winter time. We have something like forty or fifty bottles with the different kinds of feed in, and the name is written on the outside, and the student is supposed to be thoroughly familiar with the different foods. Then we put a pile of grain out on the table and take the bottles away, and ask them to write the number of the bottle and name the grain and give its composition. This generally takes two days for that; we then get them to sift the different kinds out and name each kind.

This is a picture of one of the classes taking the anatomy of the egg. The eggs are boiled in different conditions of fertility, taking the eggs that have been in the incubators and eggs that have been boiled, and make drawings.

We have coming to the University sixty-four different poultry papers, and they are put up for sale. Our students run this show themselves, and last year they sold $300 worth of these papers, and the profits of those papers paid for the whole show, buying the ribbon and everything and $20 left over.

We offer prizes for the best exhibition. We have ten breeds, and they select them without knowing which one they are going to be given. Then they draw lots, and must go to the pens and select for the exhibition two or three of those pullets, wash them, and fix them up, and the one that makes the best winning gets the five dollar prize. Then another five dollars is given to the student who makes the best record in poultry house plans—on the same plan that Prof. Graham offers a prize for making the best coops for the fattening of hens.

We are not beginning to meet the situation in New York, and yet you will be intersted to see how the progress of the work has gone on in the last four years that I have been connected with it. In the years 1905 and 1904 the total number of students registered was twenty-seven, the next year fifty-three, and the next fifty-five. and this year 77. This is an elective course. They did not have to take the poultry course; they just take two hours a day. The afternoon practice is thirty-eight days of two afternoons a week. The students do the practical work in the houses, killing the poultry, setting the eggs, and everything. The first year we had twenty-two, the next year forty-four, and the first half of this year forty-eight.

This next slide shows a piece of work that is very valuable, and that is making educational exhibits in connection with the fairs. We find it has got us in touch with a lot of people that we never had been able to reach before. This is a model of a hen house, the next is a colony house, and this other trap nests. (Applause.)

The Chairman: I do not know how we can thank Prof. Rice for the pains he has taken in showing us the interesting pictures. We all appreciate them very much, and thank him heartily. He has been doing a really good and sympathetic work.

CHICKEN RAISING.

By Wm. McNeil, London, Ont.

You want to know how I went into the business and how I got along. I remember the first chicken that I ever owned. I was tickled to death; it was a little pullet, and I said to myself, "I am going to start and raise chickens."

When I came out to this country I remember there was a firm by the name of John and W. Peters. They were our best chicken people at that time. I went to them and I got some White Dorkings and I got Golden Bantams. I kept moving on, and I got more and more. I want you to bear in mind that I was a shoemaker, and worked at the bench, and still had these chickens and looked after them. I was not like the boys now; they want all day to look after a few chickens. I felt that I would like to show some birds, but I did not go and buy. We had to breed them, and there was only ten or fifteen varieties. I remember my friend Oke and myself on different occasions going to directors and saying, "I will give you a cockerel or a pullet if you will get this variety on the prize list next year," and in that way we got them all on the prize list. We guaranteed to pay them half the prize money if they would put them on the list, and then we would get a good exhibit, so that we would have nothing to pay. In raising chickens I was very successful all my day; there was no luck about it.

Mr. Graham: How long have you been in the chicken business?

Mr. McNeil: Now, you want to get at how old I am. I have been in the chicken business forty years in this country. I was a little chicken man as a boy. I was 20 years old when I came to this country, and I have been in the chicken business for forty years. I started first to exhibit, and was successful, and went on till I got up to twenty-two varieties. That gives you some idea as to how a man has to hustle to keep twenty-two varieties. Those who know me know the success I have made with every variety, and we did not have the opportunities that we have to-day to go in the show, because now any of the boys can go in and buy and show and win. I do not think there is any disgrace in that, because we want them to buy and win and put the money into it. And so I went along, and was a success and made money. I met a man a day or two ago and he said, "I hear you are going out of the chicken business." I said, "No, I cannot do that; but I have sold out all but the Polands. I have made enough money, and I do not want to accumulate, for I have enough for myself and wife, and that is all I care for, and whatever would be left I would only get thanks for; and I never work for thanks, I only work for money. I don't care if I never make another cent. But I don't go showing for nothing; I want to get the prize. The trouble is a great lot of boys do not fix the birds before they take them to the show. You had better fix them at home. I could tell you lots about the way I fixed up chickens for the three World's Fairs. I won more money prizes than any other exhibitor at Chicago. I was the biggest breeder there, and I won the most prizes at the Pan-American. I did the same at St. Louis. I won $1,360 on chickens, and that was something for a Canadian. I went as far as Kansas City to show, and I won as high as $800 or $900, besides winning three pianos.

Mr. Graham: You pretty near fetched the show.

Mr. McNeil: No, the Show burst. (Laughter.) It did not burst in my hands, because I came away before it burst. I try to show at the first, because you get your money then. There was a piano for the largest exhibit, and then there was another for the second largest exhibit. When I got there, being a Canadian and not being much to look at, they had a deal of sympathy for me. I found out who was exhibiting and the amount of their exhibit; then I divided mine, and made it for first and second. (Laughter.) I was a stranger in a strange land, and I said, "Now, I am here on my own hook, and I have to win." When I went out west I was younger, and I expected when I got out there that I would see every man and woman with hair on them like Buffalo Bill. I was well treated, and I can say this much, that if we had the kind of people here in Ontario that we have in the west we would have more go-ahead in us. They would come into the show every morning and they would say, "Here is Mr. McNeil, who has come thousands and thousands of miles," and if you had a hundred birds they would make it two hundred birds. Now, our people do not do that; they have not enough "go-ahead" in them. I do not want to look Mr. Donovan in the face and say that, because he is going ahead; he is improving fast. I do not want to go over all these things, because I feel ashamed to tell you the same things over again. I have been very successful in breeding. It is a mystery, but I will tell you the way I do. First, we have the eggs produced right, and then they are sure to hatch. A hen has an awful job to hatch a poor egg. I was over to a man's place the other day, and he had thirty nice chickens. He said to me, "I do not see why these eggs do not hatch at all." I said, "You ought to know; there is too much hen. I would not give five cents for about twelve of these hens for breeders." He said, "Is that so?" I said, "Yes." Let me give you some idea of how to breed birds. We always breed from about two matings, and I want to tell you you cannot breed right if you do not breed from two matings. It is not quantity, it is quality, you want to breed for. If it is a cockerel bird I am to breed I take two hens. I believe in a 2-year-old hen to breed from, because then you get the best eggs. I only breed from that male and two females, and I get a bigger per cent. of pullets from that. I say we must overbalance the way we want the birds. When we breed for cockerels we breed from cockerels, and we get them.

You are going to have an awful time hatching chickens if the eggs are not right. Get the eggs right first. There is much in the way they are fed. Do not, whatever you do, breed from a hen unless you hear the hen going around singing. That hen always produces a good egg. You always have to get the eggs right first, and when you are setting thirteen eggs only put in nine. Mr. Graham was telling about putting those eggs under a hen, and of her turning some of them out, and they will get cold and you will have no chickens. That is the fault of the man in looking after the eggs. As to setting the hen on the floor, I have had as good luck with a hen setting on a high place as down in the cellar. If the egg is right there is no trouble whatever in hatching it. I have had experiments with three incubators, and it was no better to hatch with them. I followed instructions and used judgment, but when a man has no judgment he has a job to make the incubator hatch. Any machine, in my opinion, will hatch the eggs. They are getting them down pretty well, and I think it is the fault of the operator if they do not do good work. I have had the Prairie State for over twelve or thirteen years, and the Chatham and the Cyphers now, and every one hatches with me. I follow instructions, and use a little judgment. Whatever you do, I want to tell you to get the eggs right, and then you have no bother. You take three hens and you set them, and they would all be grand setters. Some of them set standing for a couple of days, and it would take about twenty-two or twenty-three days, for the reason that the hens do not set in the beginning. We are very foolish sometimes in getting the eggs under the hen too quickly. We never should put the eggs under the hen. If the eggs are good the hen will hatch them from nineteen to twenty days; but when you have chickens coming out about the twenty-second day, you are going to have weakly chickens. That is the cause of it, because they are not hatched right. In regard to mating them, I believe there is no man in this country, till he has bred a flock about three or four years, can tell what he is producing. You can go and buy one to win, and you can take that bird, but you cannot tell what that bird is going to produce the next year. The only way to make the thing a success is to buy the best and then establish your own strain.

My friend here wanted me to say something about Cochins. I suppose you would be afraid to take the Buff Cochin with a white wing. When you get the white in the wings you get a more even color. I would not be afraid to breed that with a nice pullet, but it would be no use to breed for cockerels from a male bird that had white in its wings. I would rather have a black feather.

Q.—What about the breeding of cockerels or pullets? Does it make any difference?

A.—I have never bred them, but you can breed them from the type; but for the color, that I have never thought of. In white birds of any kind of course we take our white birds, and we generally say all we have to get is shape; but I would not want to breed from a creamy bird under any consideration. You can color-feed any bird; you can color your white ones by color-feeding, and you can keep them white. I do not think any man should keep White Wyandottes and feed the yellow corn. There is this much about feeding birds: a great many people run away with the idea that if the bird runs out in the sun it will tan. It is true it will tan when the feather is a matured feather; but you have to let them run in the sun to ripen the feather. If you shut a white bird up, its feathers will get creamy. You can let it out in the sun to get white, but you must not let it stay out there long enough to tan. He would not get creamy in front of the windows.

The CHAIRMAN: Prof. Graham has called for some experience addresses, and I might say we have a young lady with us who has had extensive experience, and it my break the monotony if we would ask her to say a few words to us. I have now much pleasure in calling on Miss Yeates, who has had some experience in England.

ENGLISH POULTRY CLUBS.

BY MISS YEATES, RAYSTON, ENGLAND.

It is a little unfair for you to spring upon me at this time. I am afraid I have not my facts properly looked up. You must know we are very keen on the winter egg production in the Old Country. We have a very large demand for high class products of all kinds, as no doubt you have noticed the Old Country farmers on one of your great markets. We can obtain very high prices indeed for the best of everything. The table poultry question, for instance, is only in its infancy in Canada, yet we require a much higher breed in London, Liverpool, Scotland, and Ireland. It is a very much better finished thing altogether than I see put out here at all. I will leave the table poultry question and go into the matter of egg production, which has been interesting us a great deal. There is a great scarcity of winter eggs, and the Utility Poultry Club has taken the matter up.

MR. GRAHAM: Might I ask about the organization of that club, how it is conducted?

Miss Yeates: I cannot remember the age of the club. Mr. Holmstead was the originator. He is one of the big Scottish land-owners, and was very much struck with the wide difference between the ordinary exhibition poultry and what he considered necessary as a utility type. We have gone to a great extreme in breeding exhibition types almost to the exclusion of their utility characteristics.

The Brahma, that most hardy of birds, has to a great extent lost its hardihood and its laying capacities. The Leghorns have been bred so much for the comb development that they have lost their great activity and hardihood. Mr. Holmstead looked on it this way. The extreme development of type for exhibition purposes led him to the conclusion that something ought to be done to encourage the breeding of birds along utility lines—that is to say, not losing sight of type, but that in breeding for type the utility characteristics should be taken into consideration. At one of the dairy shows held in London every autumn by the British Dairy Association having the great poultry show in connection with it, Mr. Holmstead put forward his idea, and it was taken up very well, and certain officers were appointed. The work has grown very fast indeed. I believe last year there were 1,500 members. The annual meeting is held at the same time as the British Dairy Exhibition, in the Agricultural Hall, in London. One of the main objects of the club is to encourage the holding of winter laying competitions, so as to encourage the breeding for egg development. Another object is the Information Bureau. The Government does so much here that is in the hands of private people at home. It seems strange that those matters should be left to the people; but the clubs and societies have done a very useful work in that way up to the present time. Then there is the National Poultry Organization, of which Mr. Brown is the secretary, and he is also a member of the Utility Poultry Club. There are several other objects, but the main aim has been the giving of special prizes and special encouragement to table poultry. I think the first competition was held in 1897, and the Minorcas won, with 161 eggs. Each breeder is entitled to send in four pullets of that year, and they send their entry to the secretary. There is a secretary for the management of the competitions, as the club secretary has too much to do. Mr. Cyril Dunkley was the secretary, and the entries were sent to him, and no man is supposed to send in more than one entry. The manager is appointed by the committee of the club. They take the greatest pains to secure an efficient manager, and they go down and inspect the grounds personally and see that the houses are sanitary. One essential is the trap-nest system. Two years ago I was asked to tender for the management, which surprised me greatly, and I was appointed manager. I had started for myself by that time in Rayston, Hartfordshire, about an hour's journey from London. I set up a little plant there. I am very pleased now that I heard the discussion of open air treatment, and I find that I was pretty well ahead of my times. I adopted from the beginning for the front of my house an arrangement of glass and canvas, which you have been considering as beneficial. I had twelve individual houses, all facing in the same direction, yarded in a certain way, and the fronts of my houses were entirely of glass and canvas, according to the Canadian opinion. I tendered for thirty pens of four birds. The committee came down to inspect them, and they considered that I could accommodate six more pens; and at the end of the month I had thirty-six pens, which was the largest competition that had ever been managed. The birds came from all over the country.

Mr. Graham: About what time of the year did you start?

A.—September. The competition began in October, and continued over October, November, December, and January, as a rule. The birds came in in the middle of September. There was no restrictions with regard to feeding; I was to use my own judgment. I must say I considered it a very high compliment that they appointed me manager, as most on the committee are men, and there are 1,500 members. You understand that the male sex preponderate; therefore when I came before the meeting and told my views, they said I could have a free hand with the feeding, using my own judgment entirely. I think the only restriction was that they were to have grit. The report that I gave to the committee involved a considerable amount of labor, as you understand each bird was weighed and numbered, and the weight given when she came in. The trap-nest system was used, every egg was weighed, and the awarding of the prize is by weight, by point. A bird only scores two points for an egg weighing over 1½ ounces, and the prizes go by points, not by the number of eggs, because the club wish to consider the production of the larger egg. The demand on the English market by the high-class trade is for a very large egg.

The White Wyandottes had won this competition for two years, and White Wyandottes were third and fourth, White Leghorns fifth, White Leghorn, not of the ordinary exhibition type, what we call in England the American type of bird—small comb, small, bright, active, smart-looking birds with very small comb development. Those four birds laid 251 eggs in sixteen weeks, gaining 500 points.

Mr. Graham: What were the second, third, and fourth breeds?

A.—The second pen was the surprise of the competition, the White La Bresse, the French breed that had hitherto been known as the table bird. White Wyandottes were third and fourth, White Leghorns fifth, White Wyandottes sixth, Buff Orpingtons seventh, which was a bitter disappointment to me as I was a Buff Orpington breeder. The first year the four birds laid 245 eggs in sixteen weeks.

Q.—Did you find in those competitions that it was a question of strain more than breed?

A.—We did. The whole object of the club is to demonstrate that to the farmers; it is entirely a matter of strain, not breed. That was the first year of my management, and at its close the committee approached me and asked me if I would manage it again. At the same time the Women's Agriculture College, in which I had been, was in great difficulties. I served with them for two years, and then left to start for myself. At all events, they asked me to give up my private work and come back and see if I could help them in their crisis. There is something about college work that appeals to all who have had the privilege to take part in it. It touches you very deeply to think that the college might want your help and not be able to get it; and so I decided to go back, at a very great sacrifice, financially. The club, when they heard of it, said they would not stand in my light, and, as they wished me to manage the competition again, they would still give me the management. My whole poultry plant was carried across the country and located in the park of Studley Castle, Warwickshire, a far better situation than I had on my own place. There was a beautiful screening of woods to the north, east, and west. The woods of Warwickshire are famous for their beauty, and there was an opening to the south, and in consequence of that the competition was a greater success than it was the year before, although the year before I had obtained average record. The record in the grounds of the College was a very interesting one indeed; but again the White Leghorns won and the Worcestershire strain. The pens were only known to me by a number. I didn't know anything about the ownership of the birds till it was all over. I was distractedly curious to know in many cases who were the owners. The White Leghorns were first, and the Buff Orpingtons were second and third, White Leghorns fourth, Buff Orpingtons fifth and sixth, and the White Wyandottes were seventh. This was interesting, coming in for the seventh place, as they were the strain of birds that had won twice in the previous years.

Q.—Do you know whether the birds you had under control were naturally hatched or artficially?

A.—These Wyandottes were artificially hatched.

Q.—Had they been the previous year, too?

A.—Yes. Was not that an indication of theory of the strain telling, that Wyandottes beat all the others, and Wyandottes again? There were other birds entered, but they beat all the other Wyandottes entered. The White La Bresse were further down, and the man was terribly disappointed; but they were much younger birds, and they were fed differently.

With regard to the meat feeding the second year, I gave considerably more nitrogenous diet, and I used a little maize—you call it corn here. With regard to the average of the whole flock, the whole flock gave 140 2-3 as the egg average per pen, against 135 1-3 of the previous year. That was my first management. The second time I got it up higher; it was 150. I wish to say that in my opinion it was due to the more sheltered conditions. I do not attribute the difference to the nitrogenous feeding.

Q.—Were those pens on the grass runs?

A.—They were.

Q.—Is there any preference given to the egg now?

A.—Yes; the brown egg—the large, brown egg.

Q.—Do you sell eggs by weight?

A.—No.

Q.—They have to go a certain number to the pound?

A.—In the wholesale business it has. If you are catering for clubs and small hotels you do not go under the same rules that you do if you are catering for ordinary wholesale business. I do a large new laid egg business of solely wholesale character.

Q.—From the strictly financial standpoint, although the Leghorn came first, they might not give the biggest amount of money?

A.—That is so. Certainly you get a very big egg from the Leghorn, and their general behavior was very good. For instance, they were the first; they were the first to take advantage of the use of the subsidiary runs; in the winter they were hardy. Each house had a yard to itself, twelve birds housed together, and each had a long, narrow yard ninety-one feet long by thirty-five feet wide, and opening from the bottom of that was a large subsidiary run that was the whole width of three of the thirty-five feet wide pens, and ran down another ninety-seven feet, which was ninety-seven by three times thirty-five subsidiary runs.

They had the use of the small yard, and every third day they get the use of the big yard, and every fourth night they were given free range at the back. The front of the house was closed, and canvas, with movable screens that drew up. There were trap doors admitted into those runs, and the trap door at the bottom of the run admitted into the large run, and I had a considerable amount of hay grown in the run. It was an important asset. I got a crop of hay one year, and another year I had sheep in there.

Q.—Were they run with the chickens?

A.—No.

Q.—Would you put three breeds into a run of four birds each; that would make up twelve birds for each?

A.—Yes; the system of operating was the one you teach here, with the door below, and there were four trap-nests to each twelve birds.

Q.—Did you have trouble with the hens laying outside the trap-nests?

A.—No. It is an astonishing thing how you get to recognize the eggs. It did not occur much, and we made six visits to those houses every day. We would often catch the birds in the act of laying; but we did not leave them long without a visit. You cannot pretend to give that much labor on an ordinary farm. I am not advocating that for a moment, but at the same time it is a very good thing to be able to buy your eggs from the place where trap-nests are used. I hold a theory of my own with regard to this poultry business. I went in for the egg business, and produced new laid eggs, and I sold 7,000 eggs a week. I did not pretend to do the hatching and rearing in my own place. I kept my own stock birds, but the hatching and rearing plant was on another farm altogether, and that was run as a separate business. I have not been asked to give my opinion on these points, but nearly all mistakes made by people beginning the poultry business is that they undertake too much. One branch of the poultry business is enough to go into if you are going to go into it heart and soul; but I think it is one of the most difficult businesses to attend to from the utility standpoint; you make better profits with exhibition stock.

Q.—Did you keep an exact record of the food consumed in each of those pens, of each variety?

A.—I cannot tell you each variety accurately. You see, I got more than one pen of each variety.

Q.—Did you find the pens that are laying the best consumed the most feed?

A.—I cannot say that I did find that, because the White Leghorns were remarkably small eaters, and they won; and it does not take as much to keep a White Leghorn as it does a Lincolnshire Buff.

Q.—What is the difference between a Lincolnshire Buff and a Buff Orpington?

A.—We like to think there is a great deal of difference.

Q.—Is there any real difference, or is it purely a fad?

A.—I am not prepared to say; if you examine the feathering it is different.

Mr. GRAHAM: Is the shape something similar?

A.—Yes.

Q.—The general characteristics are very similar, but the color is different?

A.—I have heard a good many authorities say the same.

Q.—Did you have any Faverolles?

A.—Yes.

Q.—How are they?

A.—Very poor layers, but it was with them I won all my prizes.

Q.—Have you the Speckled Sussex?

A.—Unfortunately, a bird of that class died, and they did not have another to send in its place.

Q.—How much does it cost to produce a dozen eggs on your farm?

A.—At what time of the year?

A MEMBER: All the year around; taking the average?

A.—I cannot tell. It takes two shillings and a penny—about half a dollar—to feed one of those birds in a competition for eighteen weeks.

Q.—Practically a dollar and a half a year, provided they eat as much as the others?

A.—You would not give as much in the summer time. They did not feed by weight.

Q.—Did you find any difference in the price of wheat and maize there and here?

A.—Yes, a great difference. Wheat is 75c. a bushel now, and it is 4s. 6d. there—that would be $1.10.

Q.—What is the price of maize or corn?

A.—I cannot remember.

Mr. DONOVAN: It is much higher than here.

A.—You cannot always get the right kind of maize.

Mr. GRAHAM: Your meat scrap?

A.—There is a great difference here.

Mr. GRAHAM: Did you use scrap gristle?

A.—That is very expensive indeed. We found a maker of Pond's Extract of Meat, and I asked him what they did with the wastage, and they said they were prepared to put it on the market for poultry food, and they sold that at 15 shillings a hundredweight—that is $3.75—but it is not an overly high class of product.

Q.—Did you use much of Spratt's chick food?

A.—They are all so expensive that I made my own.

Mr. DONOVAN: How are the number of points proportioned?

A.—Five hundred points are the maximum, and you work down instead of working up.

Mr. GRAHAM: Five hundred is the highest amount that can be obtained?

MISS YEATES: No; that is not twice 251. The next pen got 468 points.

Mr. DONOVAN: That is two points to an egg?

A.—Yes, two points to an egg, weighing 1¾ ounces.

Mr. BALDWIN: Suppose the egg weighs two ounces, would it get an additional prize?

A.—No; they get one point for an egg, unless it is a soft shell egg.,

A MEMBER: Their eggs must be larger than they are here?

A.—Yes, it is a large egg, and, in my opinion, in looking around the eggs I have seen in Canada they run smaller here. Many thanks for your kind hearing.

The CHAIRMAN: I think it is most interesting to hear Miss Yeates speak of her experience. I hope we will hear more from her again.

The CHAIRMAN: We all know there is no man on the continent can tell us more and show us better how to fit birds for an exhibition than our good friend, William McNeil, and he will tell us the way in which to accomplish it. I was going to say something about ethics, as it were, just on the question of what is legitimate and what is illegitimate in preparing birds for exhibition. There is such a thing as perfectly legitimate breeding. There are some things in fitting birds for an exhibition that are not legitimate; that is painting the bird's legs. I use that as an illustration of illegitimate practice. We cannot have any discussion on the ethics of it, but I think it is wise to suggest a line of thought in that way; and now I have much pleasure in calling on Mr. McNeil, of London.

FANCIERS' METHODS OF BREEDING, FITTING, AND SCORING EXHIBITION STOCK.

By William McNeil, London, Ont.

I am glad to see so many here this afternoon. This is to me a hard subject to talk upon, as I am one of those practical men, I can do more than I can say. When I handle a bird I handle it carefully. I have been very successful in breeding; it is an easy thing to do. When you do a thing, do it well, and make a practice of doing it well. I want to show you something about holding the chickens. Most people catch a bird up and have him flapping about. Now, this one lies quiet; I can hold a chicken as easily as a mother can hold a baby. (Mr. McNeil then gave a demonstration, fixing a comb on a White Wyandotte cock.)

Mr. Donovan: Is that the way you manufacture White Wyandottes?

Mr. McNeil: When the comb is soft you can put it in any shape you want. You should use hot water. Let me tell whoever is breeding that kind of variety that before I would breed a bird I would make it as perfect as it was possible to make it. Like begets like, and then we are going to have them that way. I would fix the comb before I breed, not after. You may say that is a fixed comb; sure it is, no doubt of it. That is the only way to make them right if they are not right; but make them right before using for breeding purposes.

Mr. Graham: Did you keep black hens in a black hen house then?

A.—It is not wise to let the males and females see the other sex in another color. It would be better not to let the black or white see each other during the breeding season.

In breeding birds the first point is to get the bird tame. If you have them bred for the exhibition you should have them so that you can pick them up and put them any place you like. There are no people that spend as much time on breeding the birds as the game bird man. They have a stick, and every day they will go and train that bird to stand just the way they want it to stand, and when the judge comes, the birds will not fly around. The game man deserves great credit, for he trains his birds creditably. I take out a bird and handle it any place; it is no bother to take him out, and he is not frightened by the judge.

The first thing to do when we are breeding is to make our stock familiar with us. The chicken should not be afraid of its owner; if the bird is afraid of him, he is a poor owner. You should train them right, and then they will score two or three points over one that is not trained.

About feeding. Any man who knows the value of food can always feed his birds and keep them in color. I contend that every bird is color fed, and if it was not the case, we would not be so particular. We feed to produce a good color, and to get a good class, and by the way a bird is fed you get the class.

Look at the canary men. They have an article in the by-laws saying that there is a fine for color feeding. You take a bird that is poorly fed, and he does not have the color that a bird should have if he was well looked after. You can feed corn to white birds, and you will get them creamy; they will not have such a tendency to go creamy with wheat or oats. We make a mistake in feeding too much corn; corn is too fattening, and the birds will not do so well or lay so well.

Here is a nice bird. But I would take her and pull a dozen feathers out of that wing, and make that wing so that you could see every spangle in it: then you turn around to the other side, and you see this one is dark. Now, I would run over this bird, and when I would find a feather like that, I would take it out, because that is not a good feather.

Now, I will show you a good feather. This is what we call a sick feather. If I was going to show, I would remove those feathers; and the judge would never take notice, and I would not have so much express charges to pay. That is not faking.

I want to show you these combs. There is one that has never been fixed. I remember about six or seven years ago being at the New York Poultry Show. I was passing up the Langshan alley, and we were examining the birds, and just as I passed by my friend said to me: "What do you think of that bird?" It had little white tips here; it was about fifteen months old, and had never got rid of those chicken feathers. I said: "It is a good bird in a poor man's hands." The young man who owned this bird was a millionaire, and he followed me up and said: "Look here, you said that was a good bird in a poor man's hands; I am not a poor man." "Well," I said, "you are poor in the chicken business."

What we want to have in the Golden Poland is to have the lace completely around the feather. A Golden Poland is hard to breed. A Silver Poland is white and black, and the two colors will run in and mix. There is a sister to this bird here that won first at St. Louis.

Q.—What kind of crest do you want?

A.—This is about right.

Q.—What can be done to a crest that spreads too much?

A.—On a wet day I take a string and tie up the crest; the bigger we get the crest the better. I should have been an old bachelor, for I do everything myself.

Q.—Do the white crested black pullets come with a solid black crest?

A.—No; there are a few feathers in that bird that we could take out.

Q.—What do you feed to get that sheen?

A.—I take equal parts of oats, cracked corn, and wheat, and I mix them. I take a dipper full of it, and they are fed that in the morning and at night; and then perhaps to-day they would get some green bone, and to-morrow some cabbage; then they get a pail of soft food only every other day.

Q.—What is the soft food?

A.—Take a little of Spratt's food and shredded wheat shorts and bran and corn meal.

Q.—Do you use any linseed?

A.—Very seldom, unless just in moulting season, for about six weeks, when they begin to shed their feathers, and on until they begin to get them. In each pail of soft food they have two big tablespoonsful of charcoal, and then, say in about a month or six weeks, I put in two tablespoons of common salts in a pail of soft food.

Q.—Did you use any treacle?

A.—Not now. I used to when I was keeping store, but I do not now, for I have to buy it.

Q.—Did you have a sugar barrel?

A.—I think if you want to grow chickens there is nothing like a little syrup or molasses or sugar and linseed occasionally. I can get chickens a good six pounds at about four months old, and have them laying. I am one of the old timers. I used to know more about chickens than I do to-day. I am lazy now. You do not want to be lazy; go all the time; never think of counting your steps. I used to be very punctual in feeding my chickens at 6 o'clock in the morning and 9, 12, and 3, and then give them something before I went to bed again. Anything that I have got I have worked for it. I look upon the chicken man as being the finest man in the world. I want to show you a scoring card I got twenty-one years ago. I got it in 1886, here in Guelph. I have been here, back and forward, this last thirty-seven years. This was for Silver Seabright; she scored 98¾ points.

Mr. Black: You told us about feeding at 6, 9, 12, and 3 o'clock, and then all they eat at night; is that for a little chick? How long do you keep that up?

A.—All the time.

Mr. Donovan: I believe that is a good, lazy man's feed. A chicken man does not want to count his steps, and a man who feeds in the hoppers, counts his steps; and he does not feed them, but just throws it to them. It is like a man going to see his girl. Why does he go three or four times a week to see her? It is because he loves her. It is the same feeling with chickens.

Mr. McNeil: Mr. Buck is one of the best of our men. In his system of feeding with his chickens he has a lot of boards nailed together, and he puts in a lot of wheat in a trough for the little chickens, where the hens cannot get at it, and perhaps twice a day he feeds them on soft food. He goes along with a pail and throws in some shorts, and they have all the wheat they can eat, and all the milk they can take, and all the fresh water. That is a very good way, but I have had no experience with hopper feeding. I would want to go and feed them myself every day. There is too much time wasted on the chickens, after all. I never give them any water till they are six or seven months old. They will be in from April till perhaps August, and they never get any water; and if we did not use so much water and soft feed we would not have so much roup. I was at William Morris's, and he had a nice lot of chickens. He was giving them Morgan's Roup Cure, and I adopted it. I took one measure full, and I put it into two gallons of water, and the chickens had no roup. I think it kills the germ.

Mr. Donovan: What time of day do you water in the winter time?

A.—I water about 10 o'clock, and the way I do I put a measure full into two gallons of that, and I go around and give them about as much as they can drink. I just give it to them once a day now.

Mr. Baldwin: With cocks, the spurs very often grow so large that they are really clumsy and trouble the birds. I saw you trim an extra long spur on a bird, and I think that a demonstration would be of interest to the audience. (Mr. McNeil then gave a demonstration of fixing the spurs on a cock bird.)

The Chairman: I am very much obliged to Mr. McNeil, and I think the meeting has benefited from the exhibition he has shown us. I am going to ask Mr. Oke to speak to us, having in mind the judging of Orpingtons.

Mr. Oke: I am sure we are all pleased with the work Mr. Graham is doing. I think he is the right man in the right place, and I must congratulate him. I do not think there is any other person in Canada that could hold on to this job as long as he has, and I am sure, with such a class as he has here to-day, he must feel that his efforts are being appreciated. I am no talker, but as far as judging poultry is concerned, I will try and do the best I can for you. I am not an advocate of the score card, but we will use it today.

In scoring, about 50 per cent. is allowed for shape and the other 50 for color. We take this bird, and you take his symmetry. He has very good width, but he fails in not being deep enough; he is not breasted enough. Now, you look at the comb, and, using your score cards, I will allow for that comb. You see all these twists in the front and the irregular spikes. Now, I should say that comb should be cut one point and a half.

Mr. **Donovan**: How much do you cut on symmetry?

A.—About one.

Q.—For weakness in points of breast?

A.—The general make-up of the bird.

Q.—How do you understand symmetry?

A.—To tell you the truth, when you cut a bird for shape in the different sections, when you cut for symmetry, you cut him twice in the same section. In the wattles, I would cut this three-quarters. There are creases in them. I would cut that ear lobe one-half.

Q.—Is that on shape?

A.—Yes, on shape—one-half on shape of the head, and cut him one-half on shape of the neck. There are some feathers not matured. He makes too sharp an angle. Cut him half on shape of back, on account of being a little too narrow. There are several feathers broken in the tail, and they do not meet as nicely as they should; I would cut him one there. The Orpington type is more the type you want. The shape of the wing is all right. The shape of feet, one-half; cut him three-quarters in color of neck. You want a rich, shiny black, and he is a dead black here. The wings are very fair,but they are a little purple here, so I would cut him three-quarters on the wing color, and back one-half, and tail one.

Q.—Why?

A.—Color is not right. He has not a good, rich, glossy tail. Breast, one-half.

Q.—Why?

A.—This is on color. I am cutting on color now. It is dull; he is bright enough in some sections.

Q.—The green color is good, isn't it?

A.—Very good.

Q.—What about the brown in his flights?

A.—There are some chick feathers in there yet.

Q.—Do you count weight and size?

A.—We are not up to that yet. A bird like that should score in the neighborhood of about 89¼.

Mr. **Graham**: Criticize the Buff Orpington. I contend that the Black is away ahead of the Buff Orpington, so far as shape is concerned. I think it is more in length of feathers than anything else.

Q.—Should we encourage the length of feathers in order to do it like a Cochin type?

A.—Not the Cochin type.

Q.—You can see there are two different types of birds; which one is a person to breed to?

A.—The first bird is far ahead of the second in the Orpington type. This second one is too pinched all over, in my opinion; carries his tail too high, and is pinched in pretty nearly every section; he has not width enough.

Q.—If he had a little longer feather it would improve it?

A.—He is pinched.

Q.—He is too tight-feathered?

A.—Yes; this bird, if he had a little more fulness of breast, I would consider pretty near the typical shape, but he fails in front for an Orpington.

Q.—What is the score by looking at it?

A.—I say about 89, or something about there.

Q.—He scored 86, and I think that is plenty for him?

A.—I thought he would score a couple of points more than that.

Q.—If that bird will not score 90 according to the score card, how many birds are going to score 90 according to the ordinary show? But he cannot score 90; he is four points short. You will find very few birds better than that one.

A.—When I was up in Winnipeg, judging, the secretary said to me: "I want you to stick right to the point, strictly, and not give us any out-of-the-way scoring." There was a third of those birds that never got a prize. I scored a Buff Orpington 86, and he said: "That bird scored 95 last year, right here at this show, as a pullet," and I considered that was every bit she was worth. She was a poor shape, and I contend that there is where the most harm is done with the scoring cards in little shows. When the competition is kind of slack and you go to work and score them up high, it is wrong. You should do the same thing at a small show as you would do at a large one.

Now, this bird is very nice in type, but fails in color of breast. Those sections do not blend together. He is too dense here in the wing, and has not that nice, level color throughout. There are two distinct colors there. There is one color there and another here, and almost another altogether on the tail.

Q.—If that breast was better, wouldn't that win?

A.—Yes, but there is too much difference between the breast and the neck. The colors do not blend together. You want nice, smooth colors that blend together.

Q.—Isn't the breast color pretty good?

A.—It is a shade too light, and a shade too dense over there. It is going to the two extremes.

Q.—What about the shape of the black hen? Is that the best type of the three?

A.—This is the best type of the three I have come to yet. She is a bit pinched across the back; a little too narrow here.

Q.—The Orpington hen should not have much cushion?

A.—It should not have any cushion. This one would fail in color pretty near all over. She is too dead in color.

Q.—In breeding for a good green-black, is it best to use the green-blacks?

A.—It would be best to use one like this—a dull black. If you breed to extreme greenish colors you get purple barring.

Q.—What about this one (a Buff Orpington)?

A.—That is a pretty level color. It is pretty near to a Golden Buff.

Q.—What is the worst defect on that hen?

A.—She has a bad tail, that is sure.

Q.—Would the feather on the leg be the worst defect?

A.—That is a disqualification. Outside of that, I consider her tail is the worst defect she has, and her head might be improved upon, too.

Q.—Is the head too narrow?

A.—Yes; too narrow across the skull. I do not consider her a good shape. She is a little smaller than the black hen, and she carries that tail too high, but she has the right length of back for the Orpington. I would call her a medium between a Rock and a Wyandotte in length.

Mr. Clark won first in Orpington cockerels at the Winter Fair, and I advised him to show it in New York. He sent the bird, and won first in a class of thirty. He was alone, so far as shape and color were concerned. You could not see where the neck left off or the back started. All the different sections blend together, and it was a real, good type. I think he won with his first hen the third prize in New York.

Q.—How did he compare with the first prize black Orpington pullet, as far as shape was concerned?

A.—He hadn't the length of feathers that the Black Orpington had. The first black cockerel weighed eleven pounds. There were a lot of birds thrown out of the show, because there were so many foreign colors. I believe there were some birds imported from England, at a cost of $700 or $800. They mated them together, and the offspring were completely covered with purple bars from head to tail. There was not one that got a mention. They had good type, but they failed in color in nearly every section.

Q.—Did you find that in the Black Hamburgs?

A.—Some.

Q.—Do you get Orpingtons too short in the legs?

A.—I think a bird should be proportioned. The larger the bird would want a greater length of leg to be in proportion.

Q.—How about the color? Isn't that about right in the females?

A.—Yes, that is about right, but there were Black Orpingtons shown at New York, when you could not see underneath them, they were down so low on the shanks.

Q.—Did they get a prize?

A.—Yes.

Q.—Doesn't the hen throw her head a little too far back?

A.—Yes.

Mr. Newton Cosh, in giving a demonstration of judging a Plymouth Rock, said: This bird is a nice type of a Plymouth Rock. It won at a large number of shows, having exhibited for quite a number of years quite successfully. I find it takes a different bird to win over on the other side from what we have here, and it should not be the case. We try to breed the bird that will bring the most money from the fancy standpoint. Now, I will give you some idea of the difference in them.

Here is a cockerel I had at a show here, and he would not get a mention in the next twenty years; but when I left home I thought I knew the judge pretty well, and I thought I had a fairly good idea of a Barred Plymouth Rock; and I expected to win on this cockerel, but I did not get anything.

I found out afterwards that he was just the bird I should have taken to Boston. You notice the fine uniform barring. First of all, he is all of one color and shade practically. Then we will take his shape. His shape suits me splendidly. Now, I would like to know what you think of this bird as to shape.

A Member: It is a little flat on the breast.

Another Member: Isn't it light in weight?

A.—It is about the standard weight, and I would not cut him for that. Of course, he is not standing as nice as he might just now. A great many people are under the impression that a Barred Rock should have a long back, very much longer than a Wyandotte is. There is not very much difference when you look at this cut between a Barred Rock and an Orpington. It is pretty hard to distinguish what is the difference between a Wyandotte and a Plymouth Rock.

Q.—Isn't it more in the length of feathers than the length of back?

A.—Yes, a little. I would rather have a Plymouth Rock approaching the Wyandotte type than I would the other way. I would not give you five cents for the long cut-away birds, in the back. I do not think they should be encouraged, because they are no good. This bird, I consider, is a good one in shape. I want to speak more particularly about the kind of bird we want. We want to show that ringy effect in the barring, and the same character all the way through. Generally, if you get the barring fine on the back, then it will break just here, and get coarse. There are two shades of coloring. We want to get a uniform coloring. You will notice that this bird has very fine, narrow barring, quite ringy.

Q.—How is he in color?

A.—It is fairly good. The standard calls for feathers equally spaced, black and white. So you see that the barring is good in that respect. It is rather hard to get the barring to extend out to the end.

Q.—How is it in the wing?

A.—The wing is pretty good in point of barring, but it is a little brown. The shape of the tail is good.

Q.—Wouldn't that tail improve?

A.—No, it is past its best; it will get worse every day now. Here is a bird, and its shape is good; it is particularly good in the breast.

Q.—Is it too long in the back?

A.—No, not for that size of a bird. Its tail is a little too long, but altogether it is a very good shaped bird.

Q.—What is the difference between the cut on those two breasts?

A.—According to the standard, we only allow four points; the cut, according to that, would be very little. This is a cockerel and the other is a cock bird.

Q.—There are not two standards—one from cock and one from cockerel?

A.—Well, I consider a half a point.

Q.—You cut them 12 per cent.?

A.—Yes; I consider the other 12 per cent. better.

Q.—You would not cut the other one at all?

A.—No, not in shape. He is nice in front, but the tail is rather sharp and too long.

Q.—What about the cockerel's head?

A.—He has a good average head. It is not perfect, but it is better than the average one. One thing I do not like about a Barred Plymouth Rock is a coarse texture. This one is not as finely barred as the other. The color of the hackle is pretty good. This one here is black, as if he had been pulled down a chimney.

Q.—Would you use that bird for breeding cockerels or pullets?

A.—For breeding cockerels: yes, certainly.

Q.—Would the people like to see a pullet breeder?

A.—Yes.

Q.—This is a splendid cockerel. I do not care what he looks like, as long as he breeds all right.

Q.—You would expect to get good cockerels?

A.—Yes, quite possible.

Q.—You breed him to darker females?

A.—Yes, you would have to do that.

Q.—What is the fault of that tail, in having too long feathers?

A.—You would not get one in a million without that.

Q.—What about the head?

A.—I would not find much fault with it.

Q.—It is a better head than the cockerels?

A.—Yes, a better one.

Q.—It has not a very good comb?

A.—Pretty good; there art no thumb marks or crinkles.

Mr. McNeil: If that was taken out it would make the comb better. If you cut that off, you would have a comb that is all right.

A.—It would be rather short.

Mr. McNeil: I would not cut it off; I would round it.

Mr. Cosh: He has a splendid beak. It is only in recent years that they used these females to breed with. There is that much difference between the color. You take perhaps the sister of this cock bird and they are so dirty and black you would not give one dollar for them. They do not approach the quality for exhibition purposes. The sister of this bird here would almost surely approach the ideal color for exhibiting purposes. Now, there is the extreme in the two matings. Here is a female that was winning at shows. She is a bright blue color, but the color won't last; it fades. No matter how clean she is, the judges at New York would not take her out of the coop, because she has not enough fancy-work about her. The standard calls for parallel birds, equally spaced, black and white, and they should be clean-cut.

Q.—You can pull some of those feathers out.

A.—No, you cannot. The bird is too coarse. She shows too much white. We take this old hen, and she would never be looked at in our Ontario show.

Q.—How about next year?

A.—She would stand a better chance next year.

Q.—Is that the coloring you will show next year, when you show

A.—I think it will be a little better. There is equal barring there. I do not maintain that because she is not better in color that she should not get valued for her good points. She is a good shape, and has good wings. We would call that a pretty good hen, probably, at the big shows. I do not think there are twenty hens in New York that will class better than this one.

Q.—Was our own show a better show in Rocks than it was in New York?

A.—No: we were away behind Boston. I think we are better up in the line of females than we were in the line of males, but the class of cockerels at Boston was the finest we had ever seen.

Mr. John S. Martin then gave a demonstration of judging White Wyandottes: This hen here has a very good front. She is deep, but I would like her better if she was a little rounder. I do not like to see that wedge. It is not right to have the wedge-shaped keel. You want them round in front, and then you want it as low as you can get it.

Q.—Can't you improve on that wedge now by drawing those feathers out? Then it would be round.

A.—She can be improved some. Of course, if you take it off, she would be higher in the breast. In point of head, I like this hen's head. You cannot have a skull too broad. I would like the head a little better up here. I thought that in the United States they had all one type in view, but I find that they have not. I find that there was a great deal of unrest. I was a little surprised, and I do not think there is any reason for it. I think we have the standard here, but they have actually been carrying hens that were nothing but Cochin. They went to an extreme; now they are going the other way. If you had one of these hens with a great big Cochin cushion and took a photo of her, it would not look any more like that standard than the Leghorn.

At the show in Boston there was a great deal of dissatisfaction on the part of the breeders. I am satisfied that they will have a change of judges. I would like to see all the parts blend. You want a perfect blending. There is too much cushion, but that cushion with the proper tail would be all right. By that I mean brought right over the cushion, and it spreads nicely. Looking at the head of this hen, I do not like it quite as well as I like the breast, and I like to see a nicely rounded comb, following the shape of the head. If you will measure this comb you will find it is almost horizontal.

Mr. Graham: It is not a rocker-comb. No, this is a much better back, but the same objection could be taken to it. If the cushion should be carried out towards the tail farther, it would be better, and that would make a great improvement. You do not get very many that will come right up to the end. Altogether that is a pretty fair hen. Her head is the worst part, and there is a hollow in the comb. That is a longer type of Wyandotte. Not the chunky form that the other one is.

This hen's tail comes up in a bunch; she has a fair breast, but the whole appearance shows that she is a longer shaped hen. The comb is very nice; she is longer in the back, and has a long head. Starting from the back, she has the same appearance.

Q.—Do you think the tail is the greatest defect of the hen?

A.—She is a little narrow, and I would like her deeper. She is rather too long for her width.

Q.—How do you like the length of the legs of the second hen?

A.—The toes are straight. There is another point I hear a great deal about in Boston, and that is as to whether they should show thigh. They should have a certain amount of thigh showing, and some do not have as much fluff as that on the thigh. This hen is a long type.

Q.—How is she for width.

A.—Rather narrow, but she is not as faulty as the last one we had in there. She has a nice, fairly full cushion. The tail is pinched a little, but it is a better tail than the last one had.

This hen has rather a nice breast, but the head has rather a big comb. It is rocker shaped and wide. It follows the head nicely, but it is a little uneven here in front. The head is fairly good, with the exception of the wattle. They used to show male birds two years ago with tremendous wattles, but I think they are doing away with that now. I do not like the long wattles.

You cannot freeze a White Wyandotte's comb. It is a strange thing in hens. I had a very good one with a good tail, but she lost several feathers. I never pulled any out: they must have moulted out.

Q.—The tail is well spread?

A.—Well spread; the day has gone by for pinched-tailed Wyandottes. They have been showing hens with a great big hump in front of the tail that covers her tail up. That is the Cochin I was talking about.

Q.—Is there a flatness between the shoulder and the keel on the side?

A.—That long wattle spoils her look, of course. She is disqualified for her comb.

Q.—Which is the best shaped head of the lot?

A.—I like to see a full head on a Wyandotte.

Q.—Her head seems long?

A.—Yes.

Q.—What about the wattles?

A.—I like a medium-shaped wattle. I have not changed my ideas a particle after seeing the Boston birds. I think they are just as undecided about certain types as we are. I like it nicely evened up, not too much cushion, and I do not like to see too much tail showing. I like them short and deep.

Q.—What about the tail being out?

A.—In feathers like that being out it might make a difference.

Q.—Would you allow a bird with a tail out to compete with a bird with a tail in? What does the standard say to that?

A.—If the feathers were going to make a difference, I would take other things into consideration. I practice the double mating to a certain extent. You breed a female with a rather heavier cushion than an exhibition bird, and you get nicer cockerels. I consider the first bird is the best type. You want to cut those legs a point and a half, for color.

Mr. **Graham**: Judges differ in opinion, and it is better that they should, or they would want to marry the same woman.

Mr. **Graham**: I think you have the birds in the right place.

Mr. **Oke**: If I was going to buy to-morrow, I should buy that little hen.

Mr. **Graham**: What do you think about it, Mr. Donovan?

Mr. **Donovan**: I would not like to say without handling them. I think I would place them the same. One hen has a very masculine head.

Mr. **Martin**: The long wattles give it that masculine appearance.

Mr. **Graham**: With your permission I would like to move a vote of thanks to all the speakers, and, for that matter, we include those of the entire Institute. We are very much obliged to Mr. Martin, Mr. Oke, Mr. Cosh, and Mr. McNeil for the sacrifice of their time, coming down here to demonstrate to us the fancy points of the birds, and we are very much obliged and indebted to Mr. Nix, Mr. Cyphers, and Prof. Rice for their remarks and in coming here to help us.

Mr. **Robertson**: I think for those of us who came here to gain information in raising poultry, it is not an occasion to pass without making special mention of the work done by Mr. Day of the Physics department. He has found time this last year to make some very accurate and careful work on what I think is the unknown part of artificial incubation. We have been going in the dark. We thought we had theories, and we concluded that a certain thing would be so, and then found out that results were the opposite to what we expected. I do not believe that an incubator will, as now constructed, hatch equal to the hen. I think we will have to know how the hen does the work. It is all right to have fresh air. I thoroughly appreciate the work done by Mr. Day, and I would move a resolution asking the Government to continue this work until we get some definite information. This is the most practical work that the Institute has to accomplish, and I would like to see this work done right in Canada. We have heard of the work done by Prof. Rice, but I think the foundation is hatching. If we cannot get our birds hatched right, we cannot feed them right. I would move that the Government be asked to keep Mr. Day at this work, and let us have some definite conclusions.

Mr. **Black**: In conversation with Mr. Graham, some questions came up which it struck me should be referred to before we left. I was one of the members of the short course, who was unfortunate in not being able to attend all the meetings. I was kept away during the last two weeks. However, I have attended the meetings of this Institute, and it strikes me that we have learned some very valuable lessons, and perhaps the most important of these lessons is the fact that most of the people who are in the business scientifically, and those who are in the business practically, in a large way, are much at sea.

Those who are to make a success in the poultry business must work, and with all the success that Mr. McNeil has made in the business it is more than possible there are some of the new things that he does not readily take to, and one of these things is hopper-feeding. It strikes me that the whole thing in this business, and the thing of most importance, is vigor. He said to us:

"Put up a big sign in your yards with 'Vigor' on it," but the question is, How shall we best attain it? It strikes me that there is only one way to procure it, and I believe that is one of the conclusions that we are coming to.

I believe that beyond question we have learned this, and Mr. Graham has brought out that fact in one of the experiments on raising vigorous birds in the corn field last year. Mr. Baldwin had the pleasure of seeing those birds, the best birds at six months that you ever saw. I believe in this case, to have vigorous birds, we must have the free range. In order to get vigor and vitality we must have the free range; and if we have that, the little chicks will balance their own ration, by having the best quality of food before them; and if they are hopper-fed and have a free range we will get vitality and get 80 or 90 per cent. of a hatch. I take pleasure in seconding the motion. The resolution was then put and carried.

Mr. Graham: In this work of experimenting, you need, in my estimation, a practical man and a scientific man together. You need the best scientist you can get to work out the problems, and the practical man to keep them going. I doubt whether you can get a practical man to carry out these scientific experiments in detail; and for that reason, if we are going to advance along this line, we must use our scientist, and Mr. Day is a splendid co-operator. He works with me to the best advantage, and I know you feel you would like to have his services retained in connection with this department, and I am delighted to hear what you have said along this line.

Mr. Nix: I do not know whether you would like to have the opinion of a stranger on this subject, but I have been connected with this work for over twenty-five years, and I have tried to make myself familiar with the work. I have tried to keep in touch with every experiment. We will say for the credit of this station, both for the directors and Mr. Day, that it is the most accurate and satisfactory work that has ever been done in the history of artificial incubation; and while you are working hard for the interests of Canada, you cannot confine this work to this station or this Province, because the interest in artificial incubation is world-wide, and it reaches beyond the confines of this Province. The work you are doing here is most valuable, and I think we appreciate it down in the States, probably more than you do locally. I would be sorry if anything should occur from any source whatever to put a stop to this work, because it is so important, and it has been done so well, that I hope it will be continued. (Applause.)

The Chairman: I know we must all appreciate the expression of opinion from Mr. Nix, coming as it does from an outsider.

After a cordial vote of thanks to Mr. Baldwin for his excellent work as chairman, the Institute meeting was declared adjourned.

Annual Report

OF

The Agricultural Societies of Ontario

(Fairs and Exhibitions)

For the Year

1906

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE)

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1906.

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TORONTO.

To the Honorable WILLIAM MORTIMER CLARK, K. C.,
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOR:

I have the pleasure to present herewith for the consideration of your Honor the Report of The Agricultural Societies of Ontario (formerly Fairs and Exhibitions) for the year 1906.

Respectfully yours,

NELSON MONTEITH,
Minister of Agriculture.

TORONTO, 1906.

ANNUAL REPORT OF THE

Agricultural Societies of Ontario.

1906.

To the Honorable the Minister of Agriculture:

Sir,—I have the honor to present herewith my second annual report including the sixth anual report of the Ontario (formerly Canadian) Association of Fairs and Exhibitions.

In addition to the report concerning the work of the Fairs Branch of the Department of Agriculture presented at the annual convention of the Fairs and Exhibitions Association, will be found a statement relating to the laws governing the agricultural societies in the New England and Central Middle States of the Union, visited by me at your request, a report concerning the two illustration fairs held last year under the direction of the Department, information relating to the ownership of live stock and the holding of spring stallion shows by agricultural societies, a description of exhibition buildings owned by various societies in Ontario and illustrations of same, and a few remarks descriptive of special features and lines of work attempted with success by different societies throughout the Province.

Trusting that this information may be of value, I have the honor to be,

Sir,

Your obedient servant,

H. B. COWAN,

Superintendent of Agricultural
Societies for Ontario.

Ontario Association of Fairs and Exhibitions.

OFFICERS FOR 1906.

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DELEGATES IN ATTENDANCE.

Name.	P. O. Address.	Society.
Andrews, C. H	Streetsville	Toronto.
Allen, William	Holstein	Egremont.
Allen, F. T	Hampton	Darlington.
Alexander, Wm	Burk's Falls	East Parry Sound.
Andrews, James C	Cobourg	West Northumberland.
Atkinson, Chas	Caledon	Caledon.
Aylesworth, J. B	Newburgh	East Camden.
Aylesworth, B. M	do	do
Buffton, Chas	Niagara	Niagara Town & Township.
Brock, John	Thorndale	West Nissouri.
Bryan, J	Lucknow	Kinloss.
Blowes, A. J	Mitchell	Mitchell Horticultural.
Bottomley, Thos	South River	Machar.
Braden, A	Bobcaygeon	Verulam.
Bailie, Wm	Dungannon	Ashfield.
Broderick, J	Mitchell	Mitchell and Logan.
Bruce, David	Beaverton	Thorah.
Berry, Wm	Port Hope	Hope and Port Hope.
Brethour, James	Sunderland	Brock.
Bowers, J	Ripley	Huron.
Bowers, Ray	do	do
Brien, J. D	Ridgetown	Howard.
Brock, W. A	Petrolea	Petrolea and Enniskillen.
Black, W. D	Parham	Hinchinbrooke.
Bowman, Robert	Humber	Toronto Gore.
Bradwin, A. E	Blyth	Morris.
Brockbank, John	Paris	North Brant.
Birdsall, A	Birdsall	East Peterboro.
Baylis, John	Mt. Dennis	West York.
Baty, Thomas	London, South	Western.
Berry, Robert	St. Mary's	South Perth.
Bonis, Daniel	do	do
Bauslaugh, F	Waterford	Townsend.
Bastedo, D. E	Bracebridge	South Muskoka.
Bowlby, A. D	Windsor	Windsor.
Clark, W. F	Grimsby	Grimsby.
Channon, Wm	Oakwood	South Victoria.
Crow, W. A	Chesley	Chesley.
Carter, R. N	South River	Machar.
Campbell, Arch	Shanty Bay	Oro.
Campbell, G. H	do	do
Craig, J. J	Fergus	Centre Wellington.
Clay, R	Burk's Falls	East Parry Sound.
Cooney, J	Brampton	Peel.
Clarridge, H. C	do	do
Cooper, J. A	Dundalk	Proton.
Chesterfield, H	do	East Northumberland.
Cruikshank, S. E	Orangeville	Dufferin.
Caister, E	Tavistock	East Zorra.
Charles, D. Hughes	Peterboro	Peterboro Industrial.
Cowan, R. E	Galt	South Waterloo.
Coo, E. R		
Coo, R		
Close, W. J	Belwood	West Garafraxa.
Carman, A	St. Marys	South Perth.
Crew, A. W	Fenwick	Pelham.
Cumberland, Barlow	Port Hope	Hope and Port Hope.
Clark, J. W	Tillsonburg	Dereham.
Clary, W	Cobourg	West Northumberland.
Dench, R. L	Lakefield	Lakefield.
Douglas, Jno	Tara	Arran.
Downey, George	Bolton	Albion and Bolton.
Deans, Wm	Fergus	Centre Wellington.
Dolson, H. A	Norval	Peel.

DELEGATES IN ATTENDANCE.—*Continued.*

Name.	P. O. Address.	Society.
Davison, J. H	Cobourg	West Northumberland.
Dempsey, J. W	Fairview	North Perth.
Dodds, George	Gordonville	Arthur.
Driscoll, Jos	Arthur	do
Duncombe, O. H	Waterford	Townsend.
Ellis, J	Lindsay	South Victoria.
Ewart, I	Chesley	Chesley.
Ewart, S. K	do	do
Evans, David	Strathroy	West Middlesex.
Ellis, E. J	Orangeville	Dufferin.
Falconer, Wm	Tara	Arran.
Feasby, Thos	Uxbridge	North Ontario.
Fisher, J. D	Baden	Wellesley.
Field, R. H	Brockville	Brockville.
Farrell, John	Forest	East Lambton.
Flint, J. B	Belleville	East Hastings.
Griffin, A. C	Waterdown	East Flamboro.
Gee, W. C	Wyton	West Nissouri.
Graydon, W. J	Streetsville	Toronto.
Garrow, G. N	Uxbridge	Uxbridge.
Gainer, W. H	Welland	Welland.
Goodfellow, G. A	Dundalk	Proton.
Gough, E	Powassan	North Parry Sound.
Goring, F. A.	Homer	Lincoln.
Gilbert, Albert	Simcoe	South Norfolk.
Gilbert, A	do	do
Gow, J. R	Wallacetown	West Elgin.
Gregg, Samuel	Ingersoll	South Oxford.
Graham, R	Elmvale	Flos.
Garvie, Alex	Kilsyth	Derby.
Goetz, Geo	Sebringville	North Perth.
Gray, George	Newcastle	West Durham.
Gould, H. J	Uxbridge	North Ontario.
Hudspeth, Jos	Caledonia	Caledonia.
Harkness, T. J	Owen Sound	North Grey.
Holmes, Wm	Comber	Tilbury West and North.
Hickson, Wm	Bobcaygeon	Verulam.
Henderson, J. M	Strathroy	West Middlesex.
Holwell, F	Baden	Wilmot.
Hoar, H. C	Hampton	West Durham.
Henderson, T. S	Rockton	North Wentworth.
Henderson, M	do	do.
Hyatt, A	Pelham Centre	Pelham.
Hyatt, I. M	do	do.
Hare, C. B	Homer	Lincoln.
Hanmer, D. G	Burford	Burford.
Henderson, W. C	Kilsyth	Derby.
Hammell, W. H	Beeton	Cardwell.
Hewer, James	Guelph	Guelph Central.
Henderson, G. G	Hamilton	South Wentworth.
Houston, John	Chatham	West Kent.
Johnson, Jas	Ohsweken	Six Nations.
Johnson, J. H	Fordwich	Howick.
Johnson, M. J	do	do.
Johnston, M. O	Goderich	West Huron.
Keene, J. S	Elmira	Woolwich.
Knowles, J. M	Dundas	North Wentworth.
Kennedy, D. B	Bolton	Albion and Bolton.
Kerr, W. H	Brussels	Grey Tp.
Kelly, H	Baden	Wellesley.
Kneeshaw, J	Bradford	Bradford.
Lytel, E	Victoria Road	North Victoria.
Lindsay, Jno	Owen Sound	North Grey.
Lindsay, A. J	Ballinafad	Erin.
Lee, George E	Highgate	Orford.
Laidlaw, Wm	Guelph	South Wellington.

DELEGATES IN ATTENDANCE.—*Continued.*

Name.	P. O. Address.	Society.
Mitchell, James	Goderich	West Huron.
Murphy, J. Thos	Simcoe	Norfolk Union.
Miller, F. H	Dundas	North Wentworth.
Ming, E	Napanee	Lennox.
Marsh, J. E	Markdale	Glenelg.
Moosley, J. F	Parry Sound	West Parry Sound.
Meads, W. J	Ceylon	Artemesia.
Moffatt, W	Picton	Prince Edward.
Martin, G. A	Ohsweken	Six Nations.
Moore, W. T	Meaford	St. Vincent.
Murney, Wm	Goderich	West Huron.
Murney, S. G	do	do.
Morrison, D	Elmvale	Flos.
Metcalf, F	Blyth	Morris.
Moody, W. J	Berlin	North Waterloo.
Miller, Geo. L	Jarvis	Walpole.
McClung, Thos	Cayuga	Haldimand.
McDowell, Wm	Comber	Tilbury West and North.
McGregor, Alex	Desboro	Sullivan.
McGuire, Wm	Waterford	Townsend.
McIntyre, W	Beaverton	Thorah.
McArthur, Jno	do	do.
McMillan, D	Priceville	Artemesia.
McDonald, A	Shelburne	Dufferin Central.
McKinley, D. F	Ridgetown	Howard.
McKay, J. M	Harriston	Minto.
McCallum, J. M	Shakespeare	East Zorra.
McFarlane, Alex	Otterville	South Oxford.
McGuire, Chas	Cobourg	West Northumberland.
McKee, Geo	Sebringville	North Perth.
McMillan, Jno	Palmerston	North Wallace.
McNamara, Wm	Hawtrey	South Norwich.
McDonald, H	Belwood	West Garafraxa.
McMahon, W. H	Wyoming	Plympton.
McAllister, D	Binbrook	Binbrook,
McTavish, D	Flesherton	East Grey.
McNeilly, J. H	Stoney Creek	Saltfleet.
McQueen, T. K	Elora	Pilkington.
McCool, Jno	Waterford	Townsend.
Nix, C. H	Uxbridge	North Ontario.
Naylor, Isaac	Islay	Fenelon.
Naftel, T. C	Goderich	Goderich Hort.
O'Reilly, Chas	Norwood	East Peterboro.
O'Neail, H. C	Paris	North Brant.
Orr, John	Streetsville	——
Oliver, R. S	Branchton	South Waterloo.
Oliver, R	do	do.
Palmerton, N. S	Walsh	South Norfolk.
Petrie, W. A	Elora	Pilkington.
Price, D. H.	Aylmer	East Elgin.
Price, A. M	do	do
Price, E	do	do
Pritchard, R. T	Fergus	Centre Wellington.
Pearson, H	Weston	West York
Purvis, R. A	Sunderland	Brock.
Payne, Jos	Moore	Moore.
Prain, John	Harriston	West Wellington.
Pursell, F. R	Simcoe	North Norfolk.
Quinlan, D	Barrie	West Simcoe.
Russell, W. S	Tavistock	East Zorra.
Randall, J. W	Niagara	Niagara T. and T.
Randall, W. F	Grimsby	Grimsby.
Reekie, Wm	Camperdown	Collingwood.
Ryder, Jas	Parry Sound	West Parry Sound.
Raycroft, T. C	Highgate	Orford.
Ross, D	Welland	Welland.

DELEGATES IN ATTENDANCE.—*Continued.*

Name.	P.O. Address.	Society.
Reaman, M	Woodbridge	West York.
Reed, Daniel	Glanford	South Wentworth.
Robotham, G. D	Strathroy	Adelaide.
Sheppard, J. W	Cayuga	Haldimand.
Stock, W. E	Waterdown	East Flamboro.
Saul, H. B	Caledonia	Caledonia.
Spier, Jas	Brussels	Grey.
Spoor, R. J	Wolfe Island	Wolfe Island.
Smith, Jas. D	Baysville	McLean.
Stothers, Thos	Dungannon	Ashfield.
Stratheras, B. T	Shanty Bay	Oro.
Sproule, R. J	Flesherton	East Grey.
Stanton, Sid	Picton	Prince Edward.
Sharp, W. J	Holstein	Egremont.
Smith, A	Shelburne	Dufferin Central.
Smith, A. N	Meaford	St. Vincent.
Stokes, John	Tweed	Hungerford.
Sutton, D	Millbrook	Cavan.
Sawtell, R. G	Woodstock	North Oxford.
Smith, Jas	Colinville	Moore.
Stevenson, A	Atwood	Elma.
Sovereign, A	Simcoe	North Norfolk.
Smith, A. H	do	South Norfolk.
Sanders, W. B	Stayner	Sunnidale.
Sanders, W	do	do
Simmons, Dr	Frankford	West Hastings.
Sullivan, M. S	do	do
Trueman, T. J	Midland	Tiny and Tay.
Tidball, Robt	Thedford	Bosanquet.
Trotter, J. O	Woodstock	North Oxford.
Teefer, T. S	Drumbo	Blenheim.
Tathan, A	Listowel	South Wallace.
Tathan, E	do	do
Tucker, Geo	Drayton	Peel and Drayton.
Vance, Robert	Ida	East Dereham.
Verrall, G. W	Weston	West York.
Willoughby, John	Sundridge	Strong.
Wilson, Geo	Drayton	Peel and Drayton.
Walker, C. H	Erin	Erin.
Wade, G	Dorchester Station	North Dorchester.
Wyant, G. V	Petrolea	Enniskillen.
Wright, W	Cobourg	West Northumberland.
Watson, J. I	Kilmanagh	Caledon.
Wiggins, H	Nottawa	Nottawasaga.
Wilson, J. F	Listowel	South Wallace.
Wilson, J. C	do	do
Wallace, T. F	Woodbridge	West York.
Winslow, G. H	Milbrook	East Durham.
Whitworth, E. J	Binbrook	Binbrook.
Wood, W	Bradford	Bradford.
Weston, John	Tillsonburg	Durham.
Young, Jon. M	Harriston	West Wellington.
Yearlings, C	Thedford	Bosanquet.
Yearley, Geo	Bracebridge	South Muskoka.
Zilliax, Harry	Elmira	Woolwich.

ONTARIO ASSOCIATION OF FAIRS AND EXHIBITIONS.

ANNUAL MEETING.

The annual meeting of the Association was held in the City Hall, Toronto, on February 21st and 22nd, 1906. The meetings on the first day were held in one of the large committee rooms, but the attendance of delegates being very large it was found necessary on the following day to hold the meetings in one of the court rooms, which proved to be none too large.

Although the attendance at the session in 1905 was the largest in the history of the association up to that date, the attendance this year again broke the record. Two hundred and fifty delegates registered. These were from all parts of the Province.

Great interest was manifested in the different discussions in each of which the delegates participated freely. A great deal of time was wasted at the afternoon session of the second day in the election of officers, which was conducted openly by nomination and ballot. This session was practically lost owing to the amount of time taken up with this work. A notice of motion was given advising a change in the constitution by which future conventions may elect the officers upon the report of a nominating committee.

Throughout the convention a great deal of interest was manifested in the Bill it was known was to be introduced in the Ontario Legislature in regard to the work of agricultural societies, but as the Bill had not been presented to the House the members were not afforded an opportunity of discussing its provisions.

The discussions were of the most helpful and instructive nature of any in the history of the Association, and the delegates returned home feeling that they had been benefitted by their attendance at the convention.

PRESIDENT'S ADDRESS.

By J. W. Sheppard, Cayuga, Ont.

In welcoming you to the eighteenth annual meeting of our Association, I take this opportunity of thanking all members of the executive, and others who have assisted me in carrying on our affairs during the past year. I trust that our deliberations at this annual meeting will be productive of great good to the societies we represent and to the agricultural interests of the Province.

Immediately after the last annual meeting, the matter of single fare for delegates attending the annual meetings of our association each year, was taken up with the Eastern Canadian Passenger Association and the concession we have striven for so long has been granted, viz., certificate plan fare arrangements on Form 6, excepting that delegates will be returned free, regardless of number in attendance, certificates to be vised and a fee of twenty-five cents charged. An officer of the railway association will attend our meeting on the second day to vise these certificates. This concession I may say applies to all conventions, but I think largely through the efforts of our Association it has been secured.

I regret to report that since our last meeting our eastern brethren have seen fit to form the Eastern Ontario Fairs Association, and held their first organization meeting in the City of Ottawa on March 9th last. I notice in the report of that meeting that the chairman stated that the object was to cut loose from all other associations, and defined "Eastern Ontario" to mean "that portion of the Province east of Kingston." The proposal to divide the Province into two parts, having one Association in the east and one in the west, was introduced at our last annual meeting, and after being fully discussed was negatived almost unanimously. I still am firmly of opinion that the interests of the Agricultural Societies throughout Ontario would be better served if we had only one Fairs Association, and I trust that our eastern brethren will yet agree with me on this point. In this connection I might suggest that a committee be appointed to wait upon the Minister of Agriculture and urge that the Department pay the railway fare of one delegate from each society when attending the annual meeting. This would, to a large extent, reduce the agitation for the organization of other Fairs Associations in different parts of the Province. The railway fare is a large item in the expenses of delegates from Agricultural Societies in the outlying parts of the Province. I understand the Horticultural Societies have approached the Minister of Agriculture with this object in view, and that as a matter of fact the expenses of the directors of the Dairymen's and Fruit Growers' Associations, and other Provincial organizations are always paid to their annual conventions.

In view of the proposed change in the distribution of the Government grants, I would strongly urge the appointment of a Provincial auditor of fair books. Besides tending to the more uniform and correct methods of keeping the books such an officer would be valuable in giving the necessary instructions to ensure correct annual reports being sent to the Department, and further he would be the means of protecting the interests of all societies in an equitable distribution of the Government grants on the basis of money expended for purposes of agriculture only, if such basis is to be adopted in the proposed new Act. I trust that if the Government introduces a new Agriculture and Arts Act that they will keep in view the interests of societies in the remote farming districts, who are not favored by railway facilities, or located near large centres, to ensure the attendance of large crowds, and large gate receipts, who are nevertheless doing far better and grander work amongst farmers than where city folks and the sporting gentry attend fairs for entertainment, excitement and a day's pleasure. With all due respect I would say here, that such societies have "got out of their swaddling clothes and are on their feet," and, therefore, do not need any further financial assistance from the Government.

It appears to be the practice for some societies to still award prizes for male grade stock, although the necessity for doing so in Ontario has long since passed away. I think this Association should strongly condemn this practice, and recommend to the Government the advisability of preventing societies continuing their practice in this respect.

A programme has been arranged of such a character as I hope will be of interest to every delegate attending this annual meeting, and an invitation is extended to each and every one to bring forward at the proper time any idea or resolution that will be a benefit to the society we represent, and I trust that our Association will continue to exert great influence in improving the status of such societies in this great Province of Ontario, the greatest commonwealth in the diadem of Britain's crown.

In conclusion I desire to say in all sincerity, that it would be an act of ingratitude if I did not express on behalf of this Association our appreciation of the able, energetic and obliging service of our Superintendent, Mr. H. B. Cowan, during the past year. He has been ever ready at all times to assist your executive, and the marked success he has attained in the duties of his office deserves great praise.

Discussion on the President's Address.

James Mitchell, Goderich: At former Association meetings it has been customary to refer the report of the president to a committee, who would report upon it and then the discussion took place on their recommendations. Whether or not this new plan will work out all right remains to be seen. I do not know that here is very much that I can say with reference to it, but I would like to congratulate you upon the large attendance that we have. We have not had any such meeting of this Association since its organization. This is the banner attendance in the history of the Association. (Applause.) With reference to the Eastern Association, I am not quite sure that the formation of two associations in this Province is desirable. The matter was so well discussed at our last annual meeting that I thought that would have settled it and we should not have had to face further discussion. It may be, as the president has suggested in his address, that some arrangement by which the expenses would be reduced for the cost of delegates attending the meetings would meet the objections that are raised by the Eastern Association. I do not exactly say that we can ask the Department to pay the expenses of one delegate from every society attending, but it might be worth while to discuss the proposition of whether or not, where the expense extends over a certain amount, some assistance of that kind might be given. The single fare from our own district is $4.05 and I would rather be excused from being one of those who would ask the Minister to have the Department pay our expenses, but other societies in distant parts of the Province having no surplus of funds, and to whom the cost of sending a delegation is a serious matter, might be assisted and if we could come to some arrangement whereby, up to a certain amount, some assistance might be given we might strike a happy medium.

I am in favor of a Provincial auditor for fair books. I know you are in danger of meeting the objection that we are making too many officials. The societies and exhibitions throughout the Province are under the immediate supervision of the Department of Agriculture, and when we accomplish a system of keeping fair books that will reach something like the ideal we shall have done very much towards justifying the existence of this Association, we shall have removed a great difficulty from the way of our Association and we will make the work of the Department and of many societies very much easier and I think we will do much towards insuring a prompt return of correct return to the Provincial office. I think an auditor, who would not only revise the books but who would be able to give valuable suggestions to societies would be an expenditure well worth the cost. It would tend to uniformity of fair books, correct returns and would keep the societies posted on the latest and best features that might assist them in their work.

Now the next paragraph is one with reference to grade male stock. I am not in a position to speak with any practical kowledge of this matter. It has been a point with my society for years that all exhibits of male stock must be pure bred. I know there is a difference of opinion with some people as to whether it is justifiable or whether one obtains the best results by resorting to grade sires. There is room for a difference of opinion in that but I think in the main it is advisable that the sires which should be encouraged by our societies should be pure bred. I do not know that I would go so far personally as to ask the Department to put a veto on offering prizes to grade male stock, but I think this Association might express an opinion on the matter which would help to educate any societies who are still carrying on this feature, help them to see the wisdom of this course, and bring them into line with the more advanced idea of encouraging only pure bred male sires.

We have, perhaps, the most practical programme we have had at any time since I have been attending these meetings, and I am sure that if we take advantage of it we shall get at what we want and what is desirable and we shall improve in our practical workings. We do not want you to be backward in making your suggestions and in "butting in" with some of the difficulties in your section. It may be a very vital matter to you and if you want light on the matter that is what this Association is for.

I may simply close by adding, without any thought of flattery, to what you have already said with regard to our superintendent. I personally know from observation and from contact and from reports something of the work he has been doing during the year, and I am glad to say that any Government who has an officer in charge of any department who is so thoroughly in earnest, and who has such a warm personal enthusiasm for the successful work of his department as the Department of Agriculture has in our superintendent, is certainly to be congratulated. We owe very much of the success of our Association to Mr. Cowan's personal efforts. I would be ashamed if I could not stand up before this Association and warmly commend his work, and I trust we will have the benefit of his assistance for many years to come. (Applause.)

Col. W. B. Saunders: I think the reading of the address and the remarks on it by the vice-president have been quite sufficient for this convention. I have no doubt in the world we are in accord with the points brought out, and there is only one remark I would like to add to it. I have much pleasure in moving the adoption of the report.

Mr. Lee: I take pleasure in seconding the motion. The motion was carried.

REPORT OF THE SUPERINTENDENT OF AGRICULTURAL SOCIETIES.

By H. B. Cowan, Parliament Buildings, Toronto.

During the past two weeks I have had the privilege of taking a trip through the states of Maine, Vermont, New Hampshire, Massachusetts, Connecticut, New York, Pennsylvania and Ohio, to investigate the work being carried on by their agricultural societies and the conditions under which these societies receive state aid. After looking into the matter as carefully as the limited time at my disposal would allow, it is a great pleasure to me to be able to report that I have come back to Canada prouder than ever of our agricultural societies and of the work we are doing in Ontario. The work we are conducting in this Province is far in advance of anything that is being done in any of the states mentioned. None of the states have introduced the expert judge system, none of them have attempted to hold illustration or model fairs, none of them hold such conventions as we do here, with printed reports that are distributed to all the societies. In fact, we appear to be much better organized and to conduct our exhibitions more on agricultural lines.

While unable to gain many new ideas for the further improvement of our work, I was able to gather valuable information in regard to mistakes that have been made across the border, and that we may make if not on our guard.

Before describing the work being done by the agricultural societies in the states I visited, and attempting to decide whether or not they are a success educationally, it may be well for us to first decide in our own minds what is a successful agricultural society. This should not be difficult. You will, I trust, agree with me that such a society is one that was organized and is managed for the improvement of the agricultural conditions in the section where it exists. To be a true success it should be absolutely clean and free from features of a demoralizing or debasing nature.

For many years practically all our agricultural societies were conducted on purely agricultural lines. Of late years, however, a new element has been introduced by the introduction of horse racing and special attractions. Now then, let us consider the part played in our exhibitions by these features. I think that you will agree that we have a number of exhibitions that could not exist if they did not conduct a certain amount of horse racing and special attractions. You will agree, also, that so long as horse racing and special attractions are introduced for the sole purpose of drawing a crowd to see and be benefited by the agricultural features, and with the object of increasing the gate receipts, that the premiums offered in the agricultural sections may be increased, they are not, if properly conducted, to be too severely condemned. I trust that you will also agree that the minute it becomes necessary for a society to expend more money for the support of the horse races and for the payment of the special attractions than it does for the cause of agriculture, that minute the main object of that society is lost sight of and that society becomes a society managed in the interests of horse racing and special attractions with agriculture as the side line.

If you are prepared to accept these views, then you may judge to better advantage the work of the societies in the states I have visited. Some persons may say that my conclusions may be unjust to the societies, owing to the fact that my opportunity for investigation was so brief and I was able to see so few people in each state. I may state, however, that I feel the conclusions arrived at are well founded. In each state I visited I interviewed representative officials connected with the state management of the societies, and I also had the privilege of carefully reading and studying the acts under which the societies receive their state aid, as well as the official returns made yearly by the different societies.

Certain States do not give any aid to their agricultural societies. These include Vermont, New Hampshire, and Pennsylvania. This being the case, I will not refer to them, other than to say that they each have a number of societies managed by joint stock companies, all of which are doing more or less for the benefit of agriculture.

Speaking broadly, I believe that I am safe in saying that while some societies in each of the New England states, where state aid is given, are doing good work, yet the fairs as a whole have degenerated until they are little better than horse trots and cheap vaudeville shows. This is due largely to the fact that there has been nothing in the regulations under which they have been working that would hold them to their proper lines. In case these conclusions may seem rather sweeping, I would like to quote the opinion of Mr. G. W. Pierce, of Brattleboro, Vt., a State Senator, and president of the largest and most successful exhibition in the state of Vermont, who has made a close investigation of the work being conducted by the societies, not only in New England, but in the other States as well. This is the conclusion reached by Mr. Pierce:—

"The state of the fairs in New England shows, notwithstanding the fact that a few fairs are doing good work along educational lines and should be object lessons for the others, that the majority of them have failed in their original purpose and have been demoralizing rather than elevating to the agricultural interests in the community where they exist. Some of the reasons of the success of some of the fairs in New England seem apparent. The management of these fairs have not lost sight of these important facts that help make the fair a success and have added some new educational features each year. Pedlars, fakirs, cheap vaudeville and all low and vulgar exhibitions, which have caused the ruin of many fairs in New Englnd, have been discarded and a higher quality of entertainment introduced."

An evidence of how far horse racing has been carried in some of these states is furnished by the annual reports of the different societies. In Maine, for instance, in 1904 the total amount expended for agricultural purposes by all the societies was $21,073.84. The total amount expended for horse racing was $20,773.87. This does not include $647.75 that was expended for the encouragement of trotting bred stallions and brood mares. As the horse racing features have been introduced largely under the plea that they tend to improve the breding and trotting stallions and mares, this money might be included with the amount expended for horse racing. If this is done you will see that the societies in Maine last year expended more in this way than for all other agricultural purposes combined. These figures, you will notice, do not include sums expended by some of the societies for special attractions. While the proportion of societies in Maine that have introduced these features is small, still a considerable number of societies conduct vaudeville performances and thousands of dollars are spent in this way.

In Massachusetts the returns made by the societies are drafted in a manner that makes it impossible to find what proportion of the funds of the societies are devoted to horse racing. Practically every society in this State, however, conducts horse racing and as the premiums paid for horse races are included in the amounts that the societies have to expend before they will be entitled to a state grant, there has been practically no check on the development of this feature of the work of the societies. Many of the societies have joined horse racing circuits and arranged the dates of their exhibitions so they will fit in with the horse racing meets.

In the opinion of Mr. Frederick H. Fowler, the first clerk of the Massachusetts State Board of Agriculture, horse racing, carried to extremes, has killed more societies in Massachusetts than any other one cause. Speaking on this subject, Mr. Fowler stated that since the horse racing and vaudeville performances have increased in prominence at exhibitions the value of the societies in the state has appreciably decreased. The societies have been gradually dying out owing to the fact that the farmers have refused to continue to support them. In proof of this Mr. Fowler stated that in 1892 there were 37 societies in the state drawing state grants of $21,352. In 1905 the number of societies had decreased to 29 and the state grants to $17,400. It will thus be seen that the number of societies in the State has decreased within the past 13 years by 20 per cent.

In Connecticut conditions are even worse. The total amount paid by societies in Connecticut for agricultural purposes in 1904 was $20,-

599.69. The total expenditure for horse racing was $19,876.00 and for special attractions $10,376.29. It will thus be seen that the societies of Connecticut expended $9,652.58 more for horse racing and special attractions than for all other agricultural purposes put together, or nearly 50 per cent. more for these features than for agricultural purposes. In addition to this the side shows and gambling features conducted at many of these exhibitions have been of such a disgusting nature as to bring out a strong protest from the best elements in the state. In fact a feature of a few of these exhibitions were side shows in which women of the most depraved nature from the worst sections of such cities as New York and Boston were paraded through the country in a most disgusting manner. To such an extent was this carried that the Connecticut State Legislature at its last session deemed it advisable to pass the following Act:—

"Section 4,403 of the general statute is hereby amended to read as follows: No person shall during the holding of any agricultural fair sell, keep, offer or exhibit for sale any intoxicating liquors or keep, manage, maintain or operate any dice game, pool, shell game, table lottery or other illegal game, or keep, manage, advertise or call any obscene, immoral or indecent show, exhibition or muscular dance, or any house or tent reported to be resorted to for the purpose of prostitution or lewdness, or have in his possession any appliance or apparatus for the conducting of such games or shows, upon or within 1,000 feet of the grounds where such fair is in progress. . ."

The passing of such a bill was deemed necessary owing to the belief that every undesirable feature mentioned in the bill had been practised at one or more of the exhibitions in the state.

I do not desire it to be gathered from this statement that all the exhibitions in these states allow these features. A considerable proportion of the societies make an earnest effort to conduct their exhibitions along agricultural lines. Were it not for this fact it is probable that state aid to the societies would have been discontinued long ago. The officer of one society in Connecticut informed me that the public had now become so accustomed to expect side shows at their exhibitions that it demanded it. The result was that when his society prohibited indecent shows at their exhibition they found it necessary to engage minstrel shows of a desirable nature to take their place in amusing the crowd.

In New York and Ohio the societies on the whole appear to be doing somewhat better work. It is difficult to learn how much the societies in New York are expending for agricultural purposes, as compared with the expenditure for special attractions. In Ohio, however, where there is no restriction on horse racing, the total amount expended in 1904 for all agricultural purposes, including exhibits of manufactures, household productions, fine arts and merchandise, was $105,014.58, while the total amount expended for horse racing was $107,627.61. This shows that $2,613.03 more was spent for horse racing than for all agricultural purposes. This of course does not take into consideration the amounts expended by many of the societies for special attractions.

These figures will serve to show that if we apply the standard set at the outset for the conducting of a successful agricultural exhibition, the societies, in most of the states mentioned, can not be considered a success.

In each of the states visited some interesting information of a general nature was gathered. In Maine the state grant is distributed to the societies in proportion to the amounts they expend for agricultural purposes, not including horse racing. The Commissioner of Agriculture reports that this system is working satisfactorily. There is a clause in the Act which prevents societies from offering prizes for grade male stock.

At the three state fairs the judging of live stock has to be done according to score card, and copies of the score cards have to be furnished to the exhibitors when a request for same is made. This system of judging has given general satisfaction, and, while there has been some criticism, it has been directed more against the basis on which the points have been awarded than against the system. The cards, I understand, are likely to be revised shortly.

In Massachusetts there is a law that prevents a society from being organized within twelve miles of an existing society, and it is the general opinion that this distance is too short.

Much valuable information was gathered in New York state. The grant paid to agricultural societies in 1904 was $231,000, which was distributed among 91 societies, exclusive of the state society. This amount was raised by means of a tax of 10 per cent. on the gross receipts of the racing associations in the state exclusive of those conducted in connection with the agricultural societies. For many years the state fair granted aid only to county societies, although there were many so called township societies. Later the grant was divided, 25 per cent. being given to the township societies. This proportion, afterwards, was increased to 30 per cent. Finally, in 1901, all the societies were placed on the same basis, and the grant was distributed among them in proportion to the amount they expended for agricultural purposes, exclusive of horse racing, and special attractions. This system has given general satisfaction and has led to a great increase in the amounts expended by the societies for agricultural purposes. In this state many societies receive grants as high as $4,000. No society receives a grant for a larger sum than it expended for agricultural purposes. Although there are only 91 societies in the state of New York, and although almost all these societies are spending several thousand dollars for agricultural purposes, there is a general impression that the number of societies is too large. To prevent an increase in the number the Act under which these societies receive their government aid includes the following clause: "No other agricultural society shall be entitled to receive any moneys under the provisions of this Act until it shall have first filed annual reports in the office of the Commission of Agriculture as herein before provided, and paid in actual cash premiums for agricultural, mechanical and domestic products, at least $1,500 a year for three consecutive years, exclusive of the premiums paid for trials or tests of speed, skill or endurance of man or beast."

All the states find it necessary to adopt similar laws dealing with certain matters. They all have laws prohibiting the entry and selling of liquor on exhibition grounds, the conducting of games of chance or gambling in any form and also pool selling, while several have restrictions in regard to the conducting of side shows of an immoral nature.

In Connecticut and Ohio, although the horse racing element is so strong that attempts have been made to secure legislation that would permit pool selling at agricultural exhibitions, the attempts have been unsuccessful. These restrictions have led a number of societies in Ohio to refuse their Government grant owing to the fact that they are able to make more money by selling pools, selling privileges to fakirs, side shows, etc.

Many reasons were advanced for the change that has taken place in recent years in the work of the societies. It is contended that when agricultural societies were first formed they were almost the only agricultural organizations, but that of late years dairymen's, fruit-growers' and other organizations have come into existence, which carry on work that formerly was conducted by the agricultural societies. Another reason commonly advanced was the great increase that has taken place in the number and size of the cities.

If I have referred at considerable length to these matters it is because I consider them of great importance. The same change that has taken place in the societies in the states is beginning to take place among the societies in Ontario. We already have societies that are expending more for horse racing and special attractions than for all agricultural purposes. Last year also an indecent show that was prohibited at the Toronto Industrial Exhibition attended a number of exhibitions in the country districts north of Toronto, where its performances were loudly proclaimed as being "for men only." A number of our societies last year also introduced these features for the first time. With the object lesson offered by the experience of the societies in the states it would appear as if we must be on our guard if we are to maintain the standard of our exhibitions. We must not lose sight of the fact that they were established for agricultural purposes and that the promotion of agriculture is their main object.

Work in Ontario in 1905.

Much excellent work was accomplished last year by the various societies throughout the Province. The weather on the whole was favorable and exhibitions generally were a decided success. Many societies improved their grounds and buildings and there was a marked increase in the demand for educational features.

Our exhibitions as a whole were more free from games of chance than for many years. The result of the work of the detectives, who made many seizures of these outfits at exhibitions during 1904, and who secured numerous convictions, was apparent last fall. Although three detectives were employed at this work they made only five seizures. In several cases the operators had set to work without the knowledge or consent of the officers of the societies. The detectives reported the exhibitions to be almost entirely free from these objectionable features.

No one feature of the work of the agricultural societies has shown greater development or is more full of promise than the increase in the demand for expert judges. Last year societies in all parts of the Province from Vankleek Hill and Alexandria in the east to Murillo in the extreme west, and from Essex County in the south to New Liskeard in the north, applied for the services of one or more judges. In all 183 societies applied for judges, being an increase of 31 over 1904. In the spring judges were sent also to eight spring stallion shows.

The great majority of the societies applied for three judges, one or two for seven, and a number for only two. These latter societies, for the most part, were located in New Ontario. There was a gratifying increase in the number of societies that applied for an extra judge for light horses. Every society of any importance should have two judges for horses. There was also an increase in the number of applications for judges of fruit, grain, vegetables, dairy products and ladies' work. The number of judges sent out in the different classes was as follows:

Horses	39	Fruit	3
Beef cattle and sheep	28	Dairy products	3
Dairy cattle and swine	27	Grain and seeds	1
Poultry	12	Flowers	1
Lady demonstrators	6	Carriages	1
Vegetables	4		

In all 125 judges were engaged, most of whom judged at several fairs. This was an increase of 35 over 1904. How great the increase in this work has been is best shown by a glance at the number of applications received from societies each year since this system was introduced. In 1901 the number was 9; in 1902, 52; in 1903, 117; in 1904, 152; in 1905, 183.

Not only has there been a great increase in the number of societies applying for judges, but societies that formerly asked for only two or three are now asking for four and five and even more. On the whole the judges did excellent work. Some complaints were received, in a few cases bitter complaints, but these all referred to the work of not more than six or seven judges, some of whom were new men. When it is borne in mind that 125 judges were engaged and that these men had to make several thousand decisions, it will be realized how satisfactory is this record.

In this connection I would like to bear testimony to the excellent work that has been done by the young men, I might almost say boys, from the Guelph Agricultural College who have gone out as judges. Several of them were so youthful in appearance that they were not employed until the regular supply of judges had become exhausted. In every case they made good and reflected credit on the excellent work being done by the live stock department at the college. In one respect these boys bring back better reports than some of our most experienced and best old judges. As a result of the training they have received they are able to explain their reasons for their decisions. This is a most important point in their favor.

A few years ago the Department paid the judges $2.50 a day and their expenses. Two years ago this was increased to $3 per day. It is evident that a still further increase will have to be made if the right class of men are to be secured. Last year some of the best judges of previous years refused to go out at that allowance. Some who did go out stated positively that they would not act again at the same salary. There are plenty of men who are willing to judge at the rate of $3 per day, but often they are not of the best class. The most successful breeders and farmers are the men needed. In the fall of the year when they are busy at home they will not look at the present allowance. It is probable the salary of the old judges at least will have to be increased. As the Department is already bearing considerably more than half the expenses of this work, it is possible that the charge to the societies may have to be advanced.

Several judges reported last fall that they had considerable difficulty with exhibitors who followed them from fair to fair. As far as possible the Department endeavors to so arrange the circuits that the same judges will not be called upon to act at neighboring fairs. This, however, is a very difficult matter to adjust. In some cases the judges place the awards on certain animals in a certain order. A day or so later the same animals may come before them again at another fair, but owing to a reversal in their form, especially if they have been driven hard, or under or over fed in the meantime, it may be no longer possible for the judges to again place them in the same order. When the judges reverse their decisions in this way it sometimes gives rise to a vigorous protest from the dissatisfied exhibitor, who announces that the judge is no good because his decisions are not consistent. This may not explain all the cases of this kind that occur, but it explains many of them. It is a point that should be taken into consideration more often than it is.

Societies will assist the Department materially if they will report promptly instances of bad judging. This will make it possible to recall a man as soon as it is found he is doing poor work. Last fall one judge did poor work at most of the fairs he visited in a large circuit, but the Department did not hear one word of complaint until just before he reached the last fair. Had the first societies in the circuit reported their experience promptly further trouble from the work of this judge might have been prevented.

The duties of the judges are of a most trying nature. Did some of the directors of the board and exhibitors understand this fact better their work would be much more easy. The great majority of the societies apply for only three judges. Many ask for only two. These men are expected to judge all classes of live stock and to do it without a mistake. This is a well-nigh impossible task. It is an easy matter for the Department to secure men who are expert judges of either heavy or light horses. It is a most difficult undertaking, however, to obtain men who are able to do satisfactory work in both classes and yet that is what most of the societies expect the horse judges to do. The same trouble occurs in connection with the judging of long and short wool sheep, dairy cattle, hogs, fruit and vegetables, etc. Societies should either apply for more judges or be more lenient with the judges they have when the latter have to do work through two classes. I hope the time will soon come when it will be possible for most of the societies to engage experts for each of the most important sections of their exhibitions.

A matter that has never been discussed at these meetings is the advisability of having the judging done by score card. At the three principal fairs in the State of Maine, as already stated, the judges are required by State law to not only judge by score card but to give the exhibitors who ask for it copies of the points awarded their animals, and of the total possible points. This system has not been tried at the small fairs in Maine, owing principally to the difficulty of securing judges who are competent to judge in this way.

One of the features of the work last year was the conducting of two illustration fairs, one at Beachburg in Eastern Ontario and one at Simcoe in Western Ontario. These are two of the most successful agricultural exhibitions in the Province, and the Department thought it well to invite the other societies in Ontario to send delegates to these exhibitions that they might learn some of the secrets of their success.

It is the belief of the Department that the time is coming when we will have fewer and larger exhibitions. It should then be possible to arrange educational exhibits and take them from one fair to another. Owing to the fact that many of our fairs last only one day and some only an afternoon, and that their attendance is very small, it is now impossible to make such exhibits. To show the nature of the exhibits that might be prepared in this way the Department introduced a number at both of these exhibitions. A special exhibit was made by the Dominion Poultry, Fruit, Dairy and Seed Divisions, the Ontario Women's Institutes and the Ontario Agricultural College. Other features of this nature were also introduced. On the whole these exhibits proved a success and the delegates who attended appeared to be well satisfied with what they learned.

The educational value of an exhibition depends upon its prize list. When the prize list of a society encourages the production of undesirable types of animals and of inferior products of the soil, such a society may do more harm than good. Many of our societies are not paying the attention to their prize lists that they should. A considerable number of the societies still offer prizes for grade males. This is a great mistake. In the State of Maine, as previously stated, a society that offers a prize for grade male stock forfeits its right to a state grant. I believe we should have such a law in Ontario.

A large number of societies are still offering prizes for varieties of fruit, grain and vegetables that the work of the Ontario Experimental Union and of the Fruit Experiment Stations has shown, should have been discarded years ago. The directors of a society should make an earnest effort to keep their prize lists abreast of the times. It would be a good idea for them to send a copy of their prize list to Prof. C. A. Zavitz, of Guelph, who is in charge of the work of the Ontario Experimental Union, and to the nearest Fruit Experiment Station. In this way they would learn of varieties of fruit, grain and vegetables, the production of which they should strive to encourage. The value of their society in this way would be greatly increased.

Another manner in which the prize lists can be greatly improved is by adding a few words in each section describing the strong and weak points of the different articles for which prizes are offered. If for instance a society in the northern section of the Province were to add Salzer's North Dakota, White Flint, or Compton's Early Yellow Flint corn to their prize list this year, with a line or two saying that a series of experiments extending over several years and conducted by the Experimental Union had shown these varieties to be better yielders than the old Canadian Yellow, a variety commonly grown in that section, the value of that prize list would be greatly increased. Scores of farmers who never read the reports of the Experimental Union would gain valuable information and some of them might be led to give these varieties a trial. In this way the societies would be of direct value to the farmers in their sections and would be carrying on the work for which they were originally intended.

To further illustrate what may be done in this direction, I would like to read the following paragraph that is found in the prize lists of several societies in the Ottawa Valley, under the heading of poultry:

> The prices paid on the poultry markets, especially by the English buyers, are so high that it pays handsomely to produce the type of fowl in demand. The chicken desired is one as broad and plump-breasted as possible, with short, medium-sized legs and small heads. The live weight of the chicken must be under five pounds.
>
> Directions for Fattening.—The best breeds for fattening are the White Wyandotte and the Barred Plymouth Rock. Chickens of these breeds should be placed in the fattening crates when they weigh three pounds. The fattening crates can be cheaply constructed by removing the floor from boxes about 16 inches wide and 20 inches high, and by nailing a slat floor on the box. These slats should be put on lengthways of the box 1¼ inches apart. The front of the box should be of slats nailed on up and down two inches apart. The chickens can be placed in the box by having a loose board on the top of the box.
>
> The best food for fattening is a thin porridge of finely ground grain, preferably oats, barley or buckwheat, and sour skim milk. The chickens should be fed a limited amount of food three times a day the first week, after which period they may receive all the mush they will eat twice a day. They should be in the fattening crates about three weeks. During the last ten days of the fattening, tallow should be added to each mash in the proportion of one pound of tallow to fifty chickens. The chickens should receive grit twice a week in their troughs, and also water every day. The fattening crates should be placed in stands sixteen inches from the ground.

A list of prizes offered for this kind of chicken follows.

There is a grand opportunity for our Agricultural College and Experiment Stations and for agricultural societies to come into closer touch with each other that they may, through the prize lists of the societies, encourage the production of the best and most profitable agricultural products. They will both be to blame if they continue to ignore this avenue of valuable work.

A number of societies continue to offer prizes for the best herd of grade cattle. This frequently brings animals of the beef and dairy type into competition and places the judges in a most trying position. It is an equally bad policy to offer prizes for the best pen of black or white pigs, or for the best flock of grade sheep. Prizes of this nature should be struck out of all prize lists.

From the reports received from the expert judges it is evident that numerous exhibitions last year were not the success they might have been, simply because the directors had neglected to pay proper attention to the little things. It is the little things often that make or mar the success of an exhibition. In some cases the directors were not on hand to look after their work, the judges' books were not ready, and other matters of a similar nature had not been attended to.

It would pay the officers of many societies to hold a special meeting a few days before their exhibition. Everything connected with the management of the exhibition should be gone over at this meeting. Any little thing that has not been attended to should be noted and someone should be deputed to see that it is not overlooked. Nothing should be left to receive hap-hazard attention the day of the fair.

At this meeting each director should make it known whether or not he will be in attendance at the exhibition. Substitutes should be provided when necessary. Certain duties should be assigned to every director and he should be made to understand that he will be held responsible for their proper performance. Not only should each officer and employee know what his own duties are, but he should know those of each person connected with the exhibition. Exhibitions lasting two days and over should have a paid superintendent. This official should look after most of the petty details that too often are left to the overworked secretary. He should be held responsible for the general management of the exhibition.

The educational poultry exhibit at the Beachburg Illustration Fair arranged by the Dominion Poultry Division at the request of the Ontario Department of Agriculture. A similar exhibit was made at the Simcoe Fair. It is believed that when Fairs are larger and last longer exhibits of this nature may be prepared and taken from exhibition to exhibition at slight expense. This was one of the best features at the illustration fairs.

On the day of the exhibition the president should have absolutely nothing to do but look after the proper running of the exhibition. If he is wise he will refrain from making exhibits while he occupies the presidency. The president should not do that which may tend to impair his power to deal with any matter that may be referred to him for his decision. He should see when the exhibition opens that every director is in his place. When a director is absent some man should be authorized to look after his duties. The president ought also to see that the superintendent, where one is engaged, is performing his work properly, and that none of the little details are likely to be overlooked. Once satisfied that everything is running smoothly, the president should assume the responsibility of host. It is he who is expected to see that the guests of the exhibition are given proper attention, that they will be sure to go away sounding the praises of the exhibition and of its management. At all times the president should be where he may be found readily. This is necessary, if a hundred and one big and little things that are constantly referred to him for settlement may be attended to without loss of time. When an exhibition does not run as smoothly as it should about one-half the responsibility may be placed on the shoulders of the president. He by virtue of his office is the executive head and while some of the blame may rest with certain of the directors, it is his duty to see that they are doing theirs.

The secretary, that most important official of all work, ought not to have anything to attend to other than his duties as secretary. Throughout the exhibition he should be in or close to his office, that the needs of the judges and various exhibitors may receive proper attention. The best secretaries are those who know how to make their directors do their full share of the work. The employment during the exhibition of a couple of boys as messengers does not cost much, and often pays handsomely. Their headquarters should be at the secretary's office.

Spring Horse Fair, held at Berlin, 1906. Note the benefit of having a good ring.

The directors ought to be on hand early and remain until the close of the exhibition. They should be in charge of some one department of the fair and should see that their division at least is given proper attention. Some directors complain that their exhibitions are run by cliques of three or four directors. Where this is the case it is because they themselves have neglected to assume the full responsibility of their office as director. It is a capital plan for the directors to arrange to have dinner together, as many as possible, with the judges and leading guests on the day or days of the exhibition. In this way they hear of little things that are being neglected, of exhibitors who are dissatisfied, and of suggestions for improvement, and it is often possible to attend to these matters in time to prevent future trouble. The directors of a majority of the most successful exhibitions in the Province have followed this plan for years, with excellent results.

A proper conception by the officers of a society, of their duties will go far to make a success of an exhibition that otherwise might be a failure. It is because a considerable number of our societies are conducted in a slip-shod manner that attention is drawn here to this matter.

Judging Rings Needed.

If there is any one matter that should be attended to more promptly than another, it is the judging rings. Lack of proper judging rings is one of the worst features of many of our exhibitions. An exhibition that is without suitable facilities for judging, particularly in the horse and cattle sections, cannot be considered a complete success. Where strong rings are not provided and where the crowd is not made to remain outside it is impossible for the judges to do satisfactory work. The exhibitors become dissatisfied and the spectators disgusted over their inability to see what is taking place. The danger also is increased.

The first thing a society should construct on its fair grounds is suitable judging rings. Cheap ones are better than none. Here is one, on the Palmerston grounds, made of posts with a rope strung through them that serves to keep the crowd back,

When it is borne in mind that judging rings can be obtained at but slight expense it is astonishing that so many societies are negligent in this respect. The best judging rings are those made of posts set closely together and sunk firmly in the ground with two or three boards nailed to them as crosspieces. Where such a fence as this is too expensive a cheaper one can be constructed of wire. Some societies have made rings that answered the purpose by stringing a strong rope through holes in posts, sunk in the ground. After the exhibition they are able to pull up the posts and store them and the rope for use another year. It does not matter so much how the rings are constructed as it does that every society should have rings of some sort. Construct these rings even before you erect buildings or make a track. They will add greatly to the educational value of your exhibition.

Societies that have good judging rings would do well to surround them with a seat or seats. These may be made of ordinary planks and the expense need not be great. The people who attend an exhibition soon become tired and are anxious to find a place to sit. Many do not care to pay to get into the grandstand. The most successful business man is the one who caters to the comfort and convenience of his customers. The same principle holds true in the conduct of exhibitions. At the Beachburg illustration fair last fall a strong seat was built all around a large horse ring, at an expense of about $40. All afternoon that seat was occupied by several hundred people, principally ladies and old men. On no feature of the exhibition were the directors more warmly commended than on this. Try it at your fair.

Apply the rule of promptness in stock show rings and provide for the comfort of visitors, and you divide the crowd with the grandstand. The main thing needed at most exhibitions is not larger exhibits, but schedule time in judging. Have a suitable place for awarding prizes, insist that every judge shall be prompt in commencing and carrying forward the work, require the utmost publicity in awarding the prizes and the contests will be as attractive as the races. Too much of this is slipshod work, done at the convenience of the officials or judge, and in a manner to bewilder and disgust the onlooker, who leans on the fence and sees little and knows less of what is going on. We admit that agricultural fairs must be educators. For this to be possible more systematic work and greater publicity is demanded in the show ring.

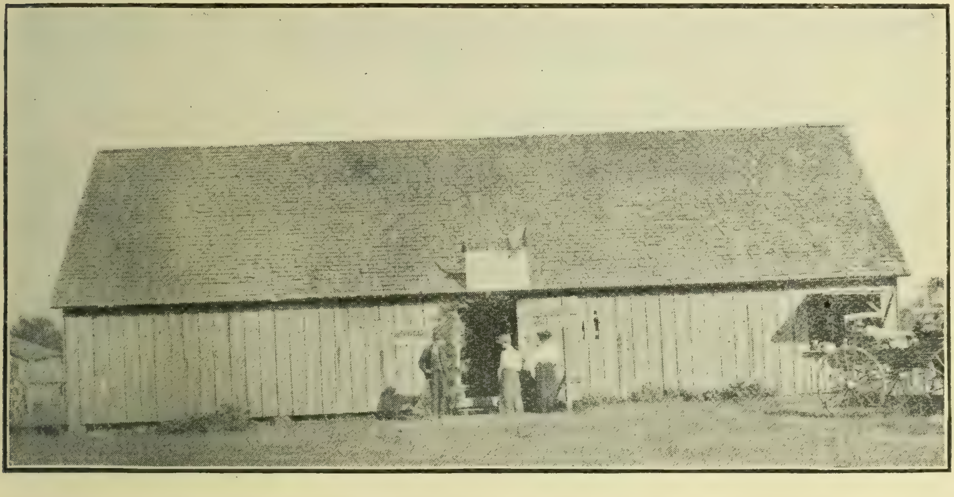
The cattle ring of the South Renfrew Society. Note the value of the ring in keeping back the crowd and giving the judge a good chance to compare the animals. These rings are appreciated by the spectators, the exhibitors and the judge. Every society should have judging rings of some kind. It is a great improvement when a ring like the one here shown has a seat placed around it. The seat does not cost much and is enjoyed by the spectators. A description of the building will be found under another illustration.

Use Megaphones.

The people at an exhibition like to know what is going on. Let them. It will pay societies that have not already done so to purchase several megaphones for use on the days of the exhibition. One of these should be kept in the horse ring and the others where needed. With a megaphone it is possible to make announcements, call out exhibits and announce awards so plainly that they can be heard all over the grounds. In this way the work of the judges can be greatly expedited and the spectators can be kept posted in regard to the principal prize-winners, and the leading features of the fair. Megaphones can be bought for from 25 cents up to two or three dollars. They last a long time. One, at least, should be owned by every society.

DINING ACCOMMODATIONS.

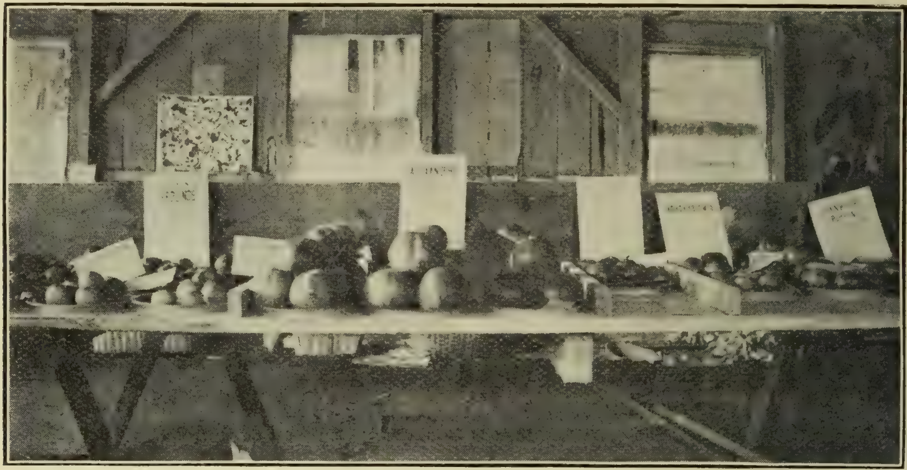
Has your society made arrangements by which it is possible for the people who attend your fair to obtain their dinner on the grounds? This dinner should be a good one and it should not be thrown at the people just because it is "exhibition time." If the hotel accommodation is not sufficient, and it seldom is, your directors will do well to make other arrangements. Some societies charge for the privilege of furnishing meals on the grounds. An excellent plan is to arrange with the ladies of the W.C.T.U. or with the ladies in some of the churches to take charge of this work. In some cases arrangements can be made to have part of the profit revert to the society. Where a suitable building cannot be secured for this purpose often tents can be used to excellent advantage. Do not overlook this feature next year.



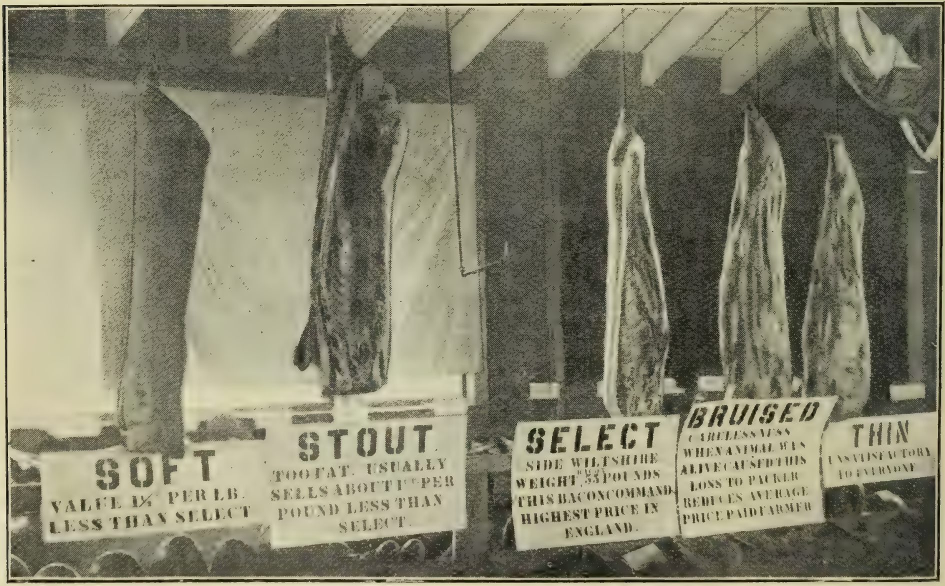
Societies that have them find dining halls a great convenience for the public. The building here shown is used as a dining hall by the Otterville Society. It was built in 1873, is 56x28 ft., cost $230, but one like it would cost about $600 now. The kitchen is built on behind.

PRINTER'S INK.

Use plenty of printer's ink. Have signs up everywhere. These should show the way to the secretary's office, draw attention to the principal features of the exhibition and the educational value of the various exhibits. Every variety of fruit, grain, vegetable, etc., should bear a card giving its name and such information as is possible concerning its value and suitability for use in the section where the exhibition is held. Were this done the educational value of our exhibitions would be increased 100 per cent. The directors of most exhibitions admit that more information of this nature should be given, but complain that it costs too much to have the cards printed and that they have not time to bother with the matter. In regard to the latter contention, all that can be said is that they should either make time or turn the work over to some person who will attend to it properly. The printing of the cards is a more difficult matter. Societies that are in earnest in their desire to strengthen this feature of the fair would do well to buy a metal stencil of all the letters of the alphabet. Stencils of all sizes of letters from half an inch to 10 inches in length may be purchased at an expense not exceeding $10. With them it is possible to print large signs, at least, without much loss of time. These signs may be painted either on cardboard or on boards. Owing to the fact that the work is rather slow it is not practical to undertake



Part of the Fruit exhibit of the South Renfrew Society. Note how the educational value of the exhibit is increased by having cards naming and describing the varities of fruit.



An exhibit of desirable and undesirable sides of bacon made at the Beachburg Illustration Fair by the Ontario Department of Agriculture. Live animals, also, were shown to further illustrate the points brought out by the exhibit of the cured sides. The cards were printed by stencils that may be bought at a cost not exceeding $10.00.

to print numerous small signs in this way. For the small signs, a box containing the letters of the alphabet in rubber, with an ink pad, may be purchased for a couple of dollars. With this little outfit scores of small signs can be printed at but slight expense and without much loss of time. At the Ontario Horticultural Exhibition last fall I had scores of small cards printed on my typewriter. These were attached to the various exhibits. In this way sightseers were able to learn the names at least of the various varieties of fruit and flowers. In many cases considerable additional information was given.

If a sufficient number of societies will take up the matter the Department will be glad to arrange to have a number of signs like the sample printed below furnished to the societies at cost price. It is the first cost of setting up the type that is responsible for the heavy expense of printing these cards. Once the type is set it is as easy to print 1,000 cards as 50, except for the cost of the extra labor and material used, which is usually trifling. The Department could readily have signs printed describing the strong and weak points of the different varieties of fowl, fruit, grain, etc., and would be glad to do so were it to receive assurance that a sufficient number of societies would like to get these signs and that they would use them to advantage once they had them. They can be furnished in lots of from ten to twenty-five for thirty-five cents a hundred. For a couple of dollars societies could secure enough cards to use the most of their exhibits. More signs of this nature, many more, are needed at our exhibitions. Let 1906 show an improvement in this respect.

Sample card that can be furnished societies at the rate of 35 cents per hundred:—

Plymouth Rocks

The Plymouth Rocks are by all odds the most popular chicken on the continent to-day. They are average layers of medium sized brown eggs. They are good mothers and sitters and would be classed as a winter laying breed and lay brown eggs averaging about eight to the pound. They are hardy, fair foragers and an all-round general purpose chicken. They are among the best chickens which we have for fattening purposes.

Fairs Insurance.

The matter of securing a system of fairs insurance against rainy weather has received considerable attention since your last meeting. Further investigation has revealed some serious difficulties, although I still believe that it will be possible to do something in this direction. Two of the chief difficulties are the following: A society may lose money in part, owing to rain on the day of its exhibition, but in the main, because the directors neglected to advertise and work up the fair the way they should have done the total loss would, however, be blamed on the rainy day. The second difficulty is that some societies might lose heavily through threatening weather, although it might not rain at all. The matter is of such importance, however, that I do not think it should be allowed to drop. In the event of the basis of the distribution of the Government grant being so changed that societies will receive their grants in proportion to the amount they expend for agricultural purposes, it may become advisable and necessary for the Department to appoint an official whose duty it will be to audit the books of the nearly 500 agricultural and horticultural societies in the Province. Such an official would be able to check the books of societies that suffers loss through rainy weather at their exhibitions and this would be a protection against the lodgement of excessive claims for assistance. With a further extension of the expert judge system the time will come when expert judges will attend practically every fair. In this way the Department will be able to receive through the judges an impartial statement as to the probable loss sustained in cases of rainy weather. In this way some of the worst difficulties will be solved. The matter is too important to be allowed to drop.

Municipal Grants.

Is your society receiving a grant from your county council? If it is not it should be. Most of the county councils in the Province give grants to their local societies. It is probable that if proper pressure was brought to bear you might be able to obtain a grant. A year ago last summer the Department issued a statement showing the annual grants made by the different councils to their local societies. One county at least gives its district society an annual grant of $500. A copy of this statement may be had on request. Arm yourself with one and get busy with your council. Grants made by county councils, like the Government grant, should be distributed among the societies in proportion to the amount they expend for agricultural purposes. Once the Government adopts this principle it will be an easy matter for the county councils to do likewise.

Competitors in the sports on horse-back at the Simcoe Fair.

DIRECT THE CROWDS.

A crowd of people is much like a flock of sheep. It rushes here and there wherever a few people lead. This tendency is responsible for many of the accidents that occur at exhibitions. One of the most difficult times at which to control the crowd is when it is rushing to leave the grounds at the close of the exhibition. At many fairs the people have to cross the track to get out, and it is here the accidents take place. The Simcoe County Fair has adopted an excellent plan for directing the crowds. Wooden benches are kept near the gate until the crowd starts to leave, when they are immediately placed across the track. In this way the horse traffic is stopped until the crowd has passed safely out of the grounds, through the passage made across the track by the two rows of benches. This plan was tried last year at the Beachburg fair, also with excellent results. It is worth general adoption.

GET OUT THE CROWDS.

Where societies hold their exhibitions in or adjoining a large town or a city it might pay them to send a small procession, headed by the band, through the city shortly before the exhibition opens each day. Several societies do this to their financial advantage. It tends to stir up the enthusiasm and to let everybody know that "Fair Day" has arrived. There are many other matters of this nature which I would like to take up, but I feel that time and your patience will not permit.

In conclusion, may I congratulate you as the representatives of the agricultural societies of the Province on the excellent work your societies as a whole are doing. Your success has been due to the fact that you have kept the cause of agriculture before you. As long as you continue to do this so long will our societies continue to be not only a success, but a credit and a benefit to the Province.

AUDITING OF FAIR BOOKS.

A MEMBER: Are you in favor of the appointment of an auditor of fair books?

MR. COWAN: Yes. If you take a body of five hundred men, like the secretaries of the agricultural and horticultural societies, it is a strange thing if you do not find fifty or a hundred below the rest. These men give the Department a great deal of trouble with their reports. In some societies crude work is done; their reports are not received for months and in some cases their accounts have to be investigated. This is why you do not get your Government grants as early as you should. If we had an auditor, it would not be necessary for him to examine the books of good societies, but he would go after those that are always behind.

A MEMBER: And he could prepare a uniform system of bookkeeping?

MR. COWAN: That is what it would lead to.

The CHAIRMAN: I am sure we have been very much interested in Mr. Cowan's comprehensive report. It contains a great deal of matter for our consideration. It is now open for discussion.

HORSE RACING AT FAIRS.

A MEMBER: If I understand it right, you sent out notices to the fairs last fall, forbidding them to have horse racing at the fairs, is that correct?

Mr. Cowan: I have had lots of fun over that notice. It did not forbid horse racing, but pointed out that horse racing was against the law and it was sent out a year ago last fall.

A Member: And last fall too?

Mr. Cowan: No, not last fall; you did not receive any notice last fall from the Department relating to horse racing.

A Member: Has the Government ever withdrawn the grant from societies that allowed horse racing?

Mr. Cowan: The Government has not got the power to withdraw the grant.

A Member: Why was the notice sent out?

Mr. Cowan: No notice was sent out that the grant would be stopped if horse racing was held. The Act reads that where a society holds horse racing action can be taken against the directors. It does not say the Department will do it. Any person in the vicinity can do it.

A Member; And the Government grant will be withdrawn?

Mr. Cowan: No, the Government grant cannot be withheld for that.

A Member: Has there been any person appointed by the Government to attend these fairs in order to see whether horse racing is carried on or not?

Mr. Cowan: No.

A Member: Statements to that effect have gone broadcast?

Mr. Cowan: No one has ever been sent out by the Government to see whether horse racing is conducted at exhibitions.

A Member: Do we then as members here understand this, that any society that wishes horse racing to take place is debarred in any sense from receiving the money given to them from the Government?

Mr. Cowan: No.

A Member: That is an interpretation that I never received before. A vast majority of the people of this Province have been misled on that point.

Mr. Cowan: The Act has been there for any person to see if they wanted to, I have sent out copies of it by the score.

A Member: Items have gone out from the daily press. The secretary has the Act, and he ought to know some of the rules; but the daily press, particularly last fall, published items saying that the Department was going to take some action in regard to stopping horse racing at the fairs.

Mr. Cowan: If any statement of that kind was made by the papers they had no authority for it. Generally the newspapers men give fair reports, but they sometimes get things badly balled up. For instance, they were responsible for the statement that we were going to have sewing machines running at the fairs instead of ensilage cutters. (Laughter.)

A Member: As one of the directors of the Dufferin Central Fair, I may state that a document was laid before the directors last fall, setting forth the statement made here to-day. I am not in a position to say from whom it emanated, but the statement was laid before the board of directors, and for that reason they had nothing in the shape of horse racing at the fair.

Mr. Cowan: The Hon. Mr. Dryden introduced that clause in the Act, so as to prevent horse racing. A clause, allowing speeding in the ring, was inserted, and after that societies conducted horse races and called them trials of speed. A year ago last summer Mr. Dryden called me into his room and showed me a number of protests that he had received against horse racing being carried to extremes, and he said something must be done. He then prepared the statement which I sent out, and this is the statement referred to here to-day. That statement simply quoted this Act, and went on to give a definition of trials of speed as compared with horse racing. The statement was not sent out last fall. The difference is that a trial of speed is where the fastest horse does not necessarily win, and where the decision rests on the value of the animal as well as on its speed. A copy of the Act and of this definition of a trial of speed was sent to every society in the Province, and if they did not understand the Act it is because they did not read it carefully.

A MEMBER: Was there not something more put in that notice, saying that the law would now take its course?

MR. COWAN: No; I will bring a copy of it down here. Later Mr. Cowan read the notice referred to which was as follows:

TORONTO, Aug. 29, 1904.

DEAR SIR,—The Department of Agriculture, having been formally notified that certain Agricultural Societies in the Province are in the habit of conducting horse races for purses of considerable value, at their fall exhibitions, the attention of Boards of Directors of Agricultural Societies, is called to Section 29 in the Agriculture and Arts Act, which forbids such practise and reads as follows:

29.—(1) "It shall not be lawful to carry on any horse racing, other than trials of speed under the control and regulation of the officers of the society, during the days appointed for holding any exhibition, by any district or township society, at the place of holding the exhibition, or within five miles thereof."

(2) "Any person who is guilty of a violation of this section shall be liable, upon summary conviction before a Judge of the Peace, to a fine not exceeding $50, or imprisonment in the common gaol of a county for a period not exceeding thirty days."

In Subsection 1 of Section 29 it reads:—"Other than trials of speed, under the control and regulation of the officers of the society during the days appointed for holding any exhibition, by any district or township society." This is interpreted by the Minister to refer to the usual process in judging double or single carriage or saddle horses of allowing them to travel around the ring for the purpose of showing their style of action and speed, so that the judges may be able to determine the best horse for the purpose as shown.

Sincerely yours,
H. B. COWAN,
Supt. Agricultural Societies.

Several members on hearing the circular read admitted that it was the one they had in mind, and that they had misunderstood it.

GENERAL DISCUSSION.

DR. SIMMONS: I think on the question of horse racing there may be a little contradistinction, and the question has come to me as secretary of one of the societies, that there is no compunction raised as to racing, from the fact that our superintendent has been over the Province and looked into the societies in nearly every section and they have not lost their ground. Regarding sending our prize list to Mr. Zavitz, that would not do, because not one prize list would suit for every district of this Province. A prize list that would be suitable for the eastern part of the Province would not be suitable for the west. It would not do to give prizes for beef cattle in a dairy district. In some exhibitions you will have only five or six head of cattle in the Jersey class, and in the Durham class you will have a big exhibit. Our friend the superintendent organized us in the Bay of Quinte District into a District Association, and with him we appoint our own days for the fairs, and we are looking for him this winter again. I think other societies in the district should come together and make up a prize list, and I do not think it should be sent to Mr. Zavitz or any individual in this Province. You cannot get one prize list that would be suitable to the entire Province, because our interests are entirely different. The judges told me we had a fair that was second to none in the Province. Our fair is at Frankford, Hastings County. We give special prizes to the man who grows the most and best varieties of fruit on his place, and the man who grows the best table vegetables get a special prize, and we had just as good an exhibit as they had at the Industrial at Toronto or the World's Fair, St. Louis.

Mr. Cowan: It is evident that my remarks have not been understood. In suggesting that the prize lists should be sent to Prof. Zavitz, I had in mind that he has 4,000 experimenters in all parts of the Province, and if a person sends a prize list from any section to Prof. Zavitz he is not going to give the results of Essex County to that man unless he comes from Essex County. If he comes from Hastings County he will give the results gained by the 20 to 40 experimenters located in that county. I realize as well as anybody that it is absolutely useless to try and draw up any prize list for the whole Province.

As regards local associations, I want to have something thoroughly understood right here and now, and that is that county associations cannot set dates, and force the Department to send the fairs judges on those dates. We are only too glad to have societies meet and prepare a statement of dates, and try and get them arranged as well as they can and then submit them to us, and we will adopt them if we possibly can. It is often the case that there are a number of societies in the section that do not join the local association, and they may want judges, and the Department, therefore, reserves the right to pass upon any circuit that may be prepared; especially as it has to pay the judges.

Coming back to the question of horse racing, it is against the law to hold a horse race at an agricultural exhibition, but nearly half the societies in the Province have been holding horse races, and defy the law, simply because the local opinion in their district has not been strong enough to compel the officers to follow the law, and the Department has never felt called on to send any person around to see if societies were holding horse racing; because we knew that fact without sending anybody around. In spite of the fact that the law has not been an entire success in Canada, and in spite of the fact that half of these societies have been holding horse races, I am satisfied that the law has been of great value to the agricultural societies of Ontario, because many of them have respected it, and have not held horse races but have conducted purely agricultural exhibitions. Were it not for that law, more of our societies would have held horse races, and on the whole we would not have been doing as good work as we are. I do not want you to think I advocate that the law should be introduced again in its present form in any new Act, because I do not think it should be; but I believe that that law has had a good effect, and I believe the societies in the States have run to extremes in horse racing simply because they have had nothing to hold them back. We must, on that account, see that precautions are taken that will prevent the horse racing element gaining control of our exhibitions. (Applause.)

A Member: Supposing horse racing is held on the agricultural grounds the day of the exhibition, and conducted right along the lines of horse racing with a view to being a benefit to the society can the Government grant be withheld from that society?

Mr. Cowan: No.

Col. Saunders: It is claimed that the Department should have the right to fix the dates for our different township fairs. I think that is going to work out very badly. I have the honor of being president of the County of Simcoe and Georgian Bay Fairs Association. We have our meetings annually, and this year, although not so large a meeting as in former years, there was not a clash in our district as to holding shows, and I have found that the assembling together of presidents and secretaries is a very great benefit, because they can consult and arrange matters. I am rather proud of having instituted this procedure in our district, and I think it is working very well. In the district I speak of we have ten or twelve towns, and the competition that exists between towns and villages is well known. If you can get these societies together, and get them to fix their dates so that there will be no clashing, I think it ought to be easy enough for the Department to fall in line and send their judges to these different fairs where there is a regular circuit formed. I think there ought to be encouragement given to us on that line, and I hope Mr. Cowan will see things from our point of view. I would like to make a suggestion, and that is if the report which Mr. Cowan has read is to be published I think it is only justice to those who are conducting horse racing to change the diction of his report where he says "that the introduction of horse racing and special attractions have a tendency to operate against the proper conducting of agricultural shows." I think we ought not to connect horse racing and fakers, and I would like to see the report amended in that direction, because although I am only a boy I know the older men in the room will remember that horse racing was practised at all the shows from the earliest date. We spent hours years ago trying to find out from our delegates how many were in favor of horse racing, and how many shut out the fakers, and those who had properly conducted trials of speed were very much in the majority, and I assume they are in the majority in this convention, and I do not think that they should be classed with the fakers, the tin men and the monkey shows that come to our shows every year. (Applause.)

Mr. SCOTT: Mr. Cowan said he did not think there ought to be a prize given for grade cattle. In our section of the country there is a great deal of interest taken in the herds of grade cattle, because we are in a dairy district and there is more interest taken in that kind of a herd then in pure bred cattle. I think if we take the prize for a herd of grade cattle out of our prize list a great deal of the interest of the show would be lost. I think prizes for grade males should be struck off at once, but I think we get the best by a cross with grade females.

Mr. MITCHELL: I want to speak of a couple of features in Mr. Cowan's report, because it will be a considerable time before that report is printed, if we are to judge from past experience. We may not have it in time for the preparation of our prize lists. I want to urge some of the suggestions with reference to sending to Prof. Zavitz and to the Agricultural College for the revision of parts of the prize list. I think that suggestion is satisfactory as far as it goes. In our section we have for some years sent our fruit prize lists to the Agricultural College, and I think it has been profitable for us to do so. They have been able to advise us as to the best fruit for our section. As to the proposition that printed cards should be placed on the fruit, giving the kind and a description of the fruit, I am prepared to hold up both hands for it. It may take a few dollars each year from my printing office, but we do not mind that, and I hope the Department will carry out the plan, because I think it would be a great means of instruction to the people who examine the fruit. I think it is a very commendable improvement.

The next matter I come back to is that of keeping fair books, and I hope the Department will be able to construct an ideal book for fairs associations, that the Department will furnish these books at a nominal price, and that some means will be arranged by which every fair can have that ideal system. I have not yet been able to see why the Department should not be able to prepare these books the same as they prepare them for the Farmers' Institute.

A Member: And furnish some bookkeepers, too.

Mr. Charles: I want to make a few remarks with regard to Mr. Cowan's address. Somehow or other, having been a president of an exhibition for three years, I cannot help thinking that Mr. Cowan must have been consulting with me, because he has carried out in that report a great many of my own ideas, but I will say that he did not get the information straight from me. I highly approve of having a Provincial auditor, and that we should have one set of books to be used by every fair association in the Province. I also approve of what he had said with regard to the prize money being awarded for agriculture alone. I have noticed that in a great many prize lists they do not make the punishment fit the crime. In some institutions they will give as much money for a cock and hen as they will give for a horse. (Applause.) I think that is altogether wrong. They will give as much for a sheep as they will for a cow, and I think that is wrong. You should take the value of exhibits that come before you and give prizes accordingly. He is perfectly right in saying that there should be special judging rings provided for all sorts of live stock. He must have gone to Peterboro' in order to get that information, because the first thing we did was to fence in rings for that purpose; a horse ring, a cattle ring, a swine ring, and a ring for judging sheep. There was an objection to bringing the swine into the ring because they fought and we had to judge them in their pen. The judges do not get fair play, nor the people do not get fair play, if a whole crowd of people are pressing around.

Another point I would like to emphasize is that everything should be done on schedule time. The first two years I had programmes printed stating every hour and the events that were to take place at that time, and last year I adopted the plan of getting about two thousand programmes printed stating the events that were to take place at a certain time. They were distributed all over, and from the beginning to the end the judging went on to the minute, and when the last class came into the ring it was exactly the hour mentioned on the programme.

I would like to see this horse racing business put upon a proper footing. We want to be straight in this matter. We do not want to have horse racing called speeding in the ring because it is not speeding in the ring by any manner of means. It is straight horse racing. (Cries of No! No!) We have heard it stated that horse racing is illegal, and that the Government knows that horse racing is going on, and we should not be put in the position that we are doing illegal acts. It says horse racing and all other immoral shows. I say it is not immoral. I have yet to go to any exhibition where I see betting on horse races except in Toronto, and it should not be allowed at all, and I believe the prizes for horse racing at exhibitions should not be very large.

If we bring a lot of stock to a place the farmers will go there and see it, but they have a perfect right to have some amusement as well. You should have amusement for the people as well as education. The first year I was connected with our fair they had no amusement at all and the people were not satisfied. They said that they could see that kind of stock any place, and that they wanted to see something else. It is a good thing for a man to bring his family to a fair and for them to be amused. I thoroughly approve of Mr. Cowan's report from beginning to end, and hope it will be carried into effect right through all the associations in Ontario.

Mr. W. H. Kerr, Brussels, East Huron: I approve of uniform books being prepared, but I must say I do not approve of the appointment of an auditor to visit fair societies. In almost every municipality we have men who are engaged to do all the auditing in connection with agricultural societies. I do not think it would be right to saddle on the Province another auditor. If there are societies who are not up to the mark, then I think they should be brought to book. I am not an advocate of horse racing, yet I am of the opinion that there is nothing wrong in showing the speed of a horse any more than there is in showing the hair on a horse's leg that is raised for hair. Farmers and others interested in horses want to see an exhibition of speed in connection with them.

I did not understand that circular that was sent out. I understood that if we allowed speeding in the ring to be conducted, we were in danger of having our grant removed from us altogether, and I know of societies that cut out that branch of the programme to the great dissatisfaction of the people. Of course I know there are a great many things presented to Mr. Cowan and to the Department that are very hard to govern. I think we ought to condemn all these things that are wrong and try to run the fairs along proper lines. I do not think the people will come to see any old cabbage. We have tried to develop our fair along agricultural lines, and at the same time afford the people a little amusement. I am sure the address given by Mr. Cowan has been full of suggestions and will send us home with ideas that will be helpful in connection with our various institutions.

Mr. Charles: With regard to giving prizes for grade males, I think that should not be allowed, and I think the Government should simply prohibit it entirely. I think that no horse should be allowed to go over this country unless he is licensed, and has a certificate, and I say that the stock of this country will never be improved unless something of that kind is done.

The Chairman: I am sure the address has been very interesting and our thanks are due to Mr. Cowan for his efforts in our behalf.

Mr. Cowan: I would like to reply to some of the points made in some of the addresses. It looks as if I am going to be kept busy explaining myself. Mr. Sheppard referred to a county association setting dates. The trouble is that most of these associations want to keep the dates of their exhibitions pretty far apart, and they set two fairs a week for about three weeks. You can easily understand what it would mean to the Department if we had to put judges out in that way. Some directors simply think of their own fairs and do not think of the judges, or the other fairs a few miles away, and unless the societies arrange their dates properly we have got to lose money. The Department is quite willing, wherever possible, to accept dates that are arranged in circuits. So far we have had very little trouble. As to grade herds, I do not suggest doing away with prizes for grade herds. What I do advise is not to offer prizes for beef and dairy herds mixed, but to offer prizes for the best grade herd of dairy cattle, or for the best grade herd of beef cattle, but do not lump the two together. With regard to printing the annual report, I may say that we have had a lot of trouble in getting the annual report out in time, and one trouble has been because the Association holds its session during the meeting of the Legislative Assembly, and all Government printing has to give way, at that time, to the Legislature.

A Member: Why could not that report of Mr. Cowan's be printed before this Association meets at all and then be incorporated in the general report?

Mr. Cowan: I can have a copy made in my office and sent to every society in the Province.

A Member: Would it not answer the same purpose for a local auditor to audit the books, and then report to the Department?

Mr. Cowan: No, because that is what is done now. Don't think for a moment that we want to do away with the local auditors. We do not. There will be scores of societies that the Provincial auditor need not go near. A lot of the local auditors don't amount to very much.

Mr. Alexander McDonald: I quite agree with you that you could not get along without a Government auditor in case a change is made in the Government grant so that societies will get their grants in proportion to what they expend for agricultural purposes.

A Member: The auditor would have to have a salary, and that would take something off our grant.

Mr. Alexander, Burk's Falls: It seems to me that if we are to get our grant according to the amount we expend for agriculture, unless we have a Government auditor we will not know whether or not we are being fairly dealt with. I know a society within sixteen miles of Burk's Falls, and I do not know how they can audit their books, because they never get a receipt for prizes, and the membership tickets are sent out without any accounting. How can they give us a return for what they have spent for agricultural purposes? And it seems to me that the Provincial auditor would go and look these matters up, and he would be our guarantee that everything was all right.

A Member: Should not the local auditor do that?

Mr. Alexander: No, because some of them are no good. We have a local auditor, and we have to account for every ticket. The auditor won't pass in accounts unless I can show a voucher for every item.

Mr. Barlow Cumberland, Port Hope: I think the suggestions for the appointment of a Government auditor is one directed towards the improvement of agricultural societies, and it is made, I am sure, not for the purpose of spying into our accounts, but to help us improve our accounts. No agricultural society can succeed unless it knows how it is getting on, and unless they keep their books right. Another thing is that there will be a uniformity of accounts, and the important work of obtaining statistics will be helped by the same method of bookkeeping. These statistics will be more accurate, and I will therefore hold up both hands for a travelling auditor. I am sure we must be very much obliged to Mr. Cowan for his excellent address. It is astonishing to notice that eternal subject of horse racing coming up; I thought we had got to the end of it. Take the agricultural fairs to-day and compare them with what they were thirty years ago, and take agricultural exhibits, as presented in the exhibitions to-day, and the horse racing that they had almost entirely in the olden days. In those days it was horse racing and agriculture and now it is agriculture and horse racing. The majority of our people come to fairs to learn something about improvements in agriculture and the improvements in stock. Others go for the purpose of seeing attractions. Every locality has some young fellow who has a fast horse, and he wants to try that horse against some other horse; but that is a very different thing from these light buggies and expanded wheels and horses that are all tied up together so that they cannot fly apart. That is the class of horses that is taken round the circuits, and that is not the kind of horse racing or speeding that we want at our agricultural fairs. One important point brought out by Mr. Cowan was the specializing of our prize lists. There is no part of this province exactly the same as another. Some parts grow better things of one kind than they can of another, and I think we should select classes that are best adapted to the neighborhood in which the exhibition is held and if we are in a dairy district we should give a larger prize for dairy cattle than we do for beef cattle. We must thank Mr. Cowan for his report.

R. J. SPROULE, Flesherton: I have been secretary of the East Grey Agricultural Association for a number of years, and I have found that there are a great variety of ways of keeping accounts. I agree with my friend who said we have no guarantee that the accounts are kept properly, and that the returns to the Government are made as they should be. I think we should have a uniform style of books and book-keeping, so that all accounts will be kept in exactly the same way, and then a provincial auditor can come in and go over the books without any trouble. I also agree with the statement that there are a great number of cases where a provincial auditor might not be required, and there are a number of cases where it might be useful to have him. We used to make a distribution of the county grant on the same principle as the distribution of the legislative grant, three fifths to the district and the remainder to the township societies. I was instructed a couple of years ago that the distribution of the grant was to be made according to the number of members returned, and I wrote about it, and I got a reply that the distribution was to be made according to the number of members.

Moved by Mr. Murphy, seconded by Mr. Hoar, that Mr. Cowan's address be adopted, and that he be tendered a vote of thanks by this Association for the great energy he has displayed and the services he has rendered to the societies in preparing the report. Carried.

ADDRESS.

BY HON. NELSON MONTEITH, MINISTER OF AGRICULTURE, TORONTO.

The pleasant duty devolves upon me of presiding, to-night, over this meeting of what we look upon as one of the most important branches of the Agricultural Department, namely, the Agricultural Societies of the Province. We have reason to be proud of that branch. Although I cannot claim to be the father of the Department, yet I am looked upon to a certain extent, as the director of the different branches connected with that Department, and possibly, my connection with the branch you represent has been of longer standing than that of almost any other. Out of some twenty distinct headings, under which we divide the work of the Department of Agriculture this takes from the provincial treasury the largest amount of money. Since taking over the Department I have been questioning, as many of you probably have been, as to whether or not the money expended on this great work is spent to the best advantage. I am glad to know that you, coming as you do from all parts of the Province, are here to discuss this matter from your different points of view.

We are here to-night to have somewhat of a "heart to heart talk" on the ways and means by which this work can be bettered that it may bring greater results for the uplifting of agriculture in this Province. Our agricultural societies are not a thing of yesterday nor of to-day. We find, on looking over the records, that as far back as the beginning of government in this Province men have been looking around for means by which the calling of agriculture might be advanced, and we find that almost identically with the organization of government in this province, over at old Niagara, an organization was instituted to help on agriculture. Meetings were held monthly, and the next year an agricultural show was attempted. That was in 1793. You see that from a very small beginning you have radiated, until the whole province is virtually covered with agricultural fairs, and the question has arisen as to whether or not we have over developed in the number of our shows.

A few things have impressed themselves upon me during the past autumn. One of them is that, in the first place, what is required among agriculturists is that feeling of pride in their calling emphasized by their actions. You represent the largest of all callings in this country, in the production of wealth, and when we go back in the history of agricultural movements we find that it was the same in the days gone by. Men are taking a greater pride in their work. The public men in this country in the earlier movements of agricultural societies allied themselves closely with these organizations, and made them somewhat of a social feature. From year to year the public men of our Province came together at these meetings, and although there were only a few of them at that time, yet they discussed the progress and the agricultural events of the year, and in this way the agricultural advancement of the country was made popular, and that is something that is lost sight of to-day. We require to have the public attention fixed on these different methods for our advancement, and it is largely by means such as I have spoken of, that this public attention is drawn to the work in hand. A great work is being done by our agricultural fairs, but, apparently, a great mass of the people are losing sight of the main object of these gatherings, and that is the educational feature. That should not be lost sight of. Men go to agricultural fairs as a matter of course, in fact very much as a matter of habit, not so much to see the improvement in the live stock exhibited this year over that shown last year, which should be one of the main features and the same is true of the other parts of the exhibition; but they come more because they are in the habit of coming. These are some of the ideas that struck me.

I was very much pleased while attending a show in the Rainy River District, at a small place called Emo, to see there the virility of the people, as expressed by their show. The people from far and near came out to that show. They had no regular pavilion, just a shed made of rough boards, and each exhibitor displayed his best products of the field. It was refreshing to see the deep interest every exhibitor took, not only in his own products, but in those of his neighbor. This feature of the shown is being lost sight of in older Ontario. It seems to me that the time is now opportune for some other step to be taken, and I believe by the re-organization of the Agriculture and Arts Act great good can be brought out of our fairs in years to come. This is the desire of the Department, and it will be the object of the Legislature to make our agricultural shows more valuable educationally, to try to draw the public attention to the exhibits, to point out through the medium of expert judges, ideals that should be set up in every line, and, as far as possible, make of the agricultural society work what it is meant to be, one of the most valuable educational links in the great agricultural education carried on in this Province.

Now I would be unkind were I to speak at any greater length. I am here to speak to you as a representative of the Government; but do not imagine that when it is stated that the Government expends $90,000 per year on this work we think that it is the Government money that is being spent. It is your money, and we are simply your trustees. (Applause.) It is our desire as your trustees to see that this money goes to the object for which it is voted by the people's representatives. I ask you, as one who has the disposition of this money, to see that this money goes for the object for which it is voted, and that it is placed where it will do the greatest amount of good for the people and for the betterment of the agricultural products of this country. (Applause.)

COL. MCGILLIVRAY: I note with pleasure what you said about what the Government is going to do, and I think it is quite proper that you should not tell us what that legislation will be, but perhaps the Government might throw out some feelers, and we might give you an expression of opinion upon certain subjects that may be dealt with. There is no doubt in the world but that the Act requires remodelling, and it is in the best interests of the agricultural exhibitions of the Province that it should be done. We have seen something in the press as to what is likely to be done, but we do not know how far that is inspired. I think you might ask for an expression of opinion upon certain subjects before the Bill is presented at the House.

The CHAIRMAN: Col. McGillivray has given me a great opportunity on this subject, but I am not going to leave myself open to criticism. I do not wish to reflect on you gentlemen as not being worthy auditors, but you can appreciate the indelicacy of my making any remarks that might be considered to cast disrespect on my colleagues. No doubt you will readily understand our Bill is largely based on resolutions passed by this representative gathering last year. It has in view the paying of the grants according to the work done. That, in substance, is the whole matter in a nutshell, and you can radiate from that almost as broadly as you care to. I believe that is a sound principle, and one that appeals to the great bulk, not only in public life, but in private life as well. In fact, it is going on the principle of that old saying, "The Lord helps those who help themselves," and I think that will convey to you an idea of the Bill. Our idea is to divide the Agricultural Societies from the Horticultural Societies. It is very patent to us all that their work should be kept separate, as far as possible, and I do not anticipate that there will be any strong opposition upon that point.

I am glad indeed to say that the present condition of public opinion in this country is calling our Horticultural Societies more widely into use. They are being used as avenues, in many villages and towns and cities throughout the country, for the purpose of beautifying public places, and that in turn is moulding and refining public opinion and the trend is entirely wholesome. We hope that the agricultural societies will be strengthened by this division; and that they will stand by themselves; and if they have no object to live for, then the sooner they die the better. I think that is, in substance, the sentiments of the men whom I have the privilege of addressing to-night, and if Col. McGillivray can take a text out of the remarks I have made, I will be more than delighted.

MR. JAMES MITCHELL, Goderich: I am glad the indications seem to be that these two associations shall carry on their work, each on its own responsibility and each in its own particular field. I like that idea because I can see there is a vast difference between the work of the two. The work of the one can best be done at a season different from that of the other. I would like to most heartily commend the remark made by the chairman, and which I hope to see carried out in every town and village of Ontario, that where there are horticultural societies they shall try to beautify the streets and boulevards of the town. (Applause.) Let me point to the city of London where exists one of the societies that is doing splendid work in that direction by offering prizes for competition in beautifying streets and boulevards and residential property. London owes much of its natural beauty to the work that is being done in that way, and in that work the horticultural society is co-operating. I would like to see a horticultural society, which I know, spend its energies in that direction. It rather jars on one's feelings sometimes to hear the very frequent admission made in a subdued tone of voice, "We are only organized for the purpose of helping the agricultural society," and I am glad we are going to have more honesty of work in that direction.

SCHOOL CHILDREN AT THE FAIR.

Mr. JAMES MITCHELL, Goderich: I am very enthusiastic in regard to enlisting the aid of the school children at our fair, and I would like to see the school children's day in almost every agricultural fair this coming fall. We tried once, on our section, to specialize it, and to my mind there was no more interesting feature of the fair than these children trooping into the grounds, and spreading themselves all over and I think that, "Children's Day" at the Industrial Fair in Toronto, is one of the brightest and best, and most successful days of the fair, and I think our associations will be doing good work, if we encourage the attendance and the co-operation of the children of our public schools at our fall fairs. It will be the best means of purifying these fairs, and we should make them so that they will be above reproach; because I do not think there is a man, who has children going to a public school of this country who would want to have his children come to a fair and see things that would do them harm. (Applause.) Therefore, I hope we shall enlarge on this idea of "Children's Day," and I would like to have some of the gentlemen who have tried it speak from experience and occupy a few minutes in enlightening those who are not so familiar with it.

The CHAIRMAN: I am sure we are quite pleased that Mr. Mitchell has opened up this subject. A number have come here to-night especially to hear this matter discussed, and we are here for the purpose of discussion, because, by that means, we invariably add to our store of knowledge. There are many who have had personal contact with this exhibition work and we would be glad to hear them.

Mr. MCDONALD, Shelburne: I am glad that Mr. Mitchell has brought up this question, because I think it would be a mistake to let it go by without having something to say. We are all aware that the boys and girls of to-day must be the men and women of the future, and they will have to attend to the fairs in their day. We have the children on the last day of our fair, and we send complimentary tickets to every school section within a radius of ten or twelve miles. We get the number of children from the teacher, and we send the tickets to the teacher, and we get the teacher to distribute these tickets among the children, and the teacher collects five cents per ticket. We have tried that for three or four years, and we have found it the means of making our fair a decided success, and we have felt the benefit of having the children with us, because when they come they bring the older people with them. If there is any better method than the one we have adopted, I will be only too glad to get the information, because it is information we are after, in order that we may take it home with us.

Mr. SPROULE, Flesherton: I think it would be in the interest of the audience to hear in what way these children are handled.

Mr. MCDONALD: We leave them in charge of their teachers. The village of Shelburne has a large school, and the children turn out in a body, and in the rural districts they are in charge of the teachers. We cannot get the country people in in time for the procession.

Mr. SPROULE: We tried it once at our fair, and the system we followed out was: We got the children together at a stated time, and supplied them with a flag and a banner each. They were headed by bands of music and were marched into the grounds. It worked very well. We only tried it one season.

Mr. Boughner, Simcoe: We have for several years held a school children's day. We have a three days' fair at the town of Simcoe, and although we felt we could not get along with less than three days, there seemed to be a little spare time the second afternoon that we hardly knew how to fill in, and at last we came to the conclusion to try this matter of getting the children out to take part. We felt that where we got the children interested, we would have the interest of their parents and friends. It took some time to get the matter worked up, and I would say that one of the best things you can do is to enlist the interest of your public school inspector for the riding. We tried it some two or three years before it began to prove a success, and now it is a decided success.

We offer prizes for the best four horse conveyance, and the teachers and children go to work and trim them up in very fine style. The horses are decorated with flags and so on. The procession is organized at the high school, and all march down, with the bands of music, in a procession. The children who are going to take part in competitive drills march round, and in that way we get up a great interest in the fair. I think that many of those who have been there will say they never put in a more pleasant afternoon than on this children's day. Prizes of $15 and $10 are offered for carriages, and then we offer prizes for fancy drills. Last fall we had enough entries to fill up the whole afternoon. Of course, in a day fair you cannot do it, but at a two day fair you can put in an hour or two, very much to the advantage of the society, and very greatly to the enjoyment of visitors.

The Decorated Van in which a Class of School Children Drove to the Simcoe Fair.

Mr. Joseph White: Last year we had the first school children's day. Each teacher took charge of their own class, took them through the different exhibits and explained them to the best of their ability. We find it a very profitable and valuable means of educating the children, and we intend to carry it out further during the year, if possible. We intend trying to get the children from outside the town as well. We gave a prize to the farmer who brought in the largest family. (Laughter.) That was the most interesting part of the show. One farmer brought in fifteen. He was a Scotchman.

A Member from West Simcoe, Barrie: A number of years ago we thought it would be a good idea to have children's day. We have a three days' fair. We formed a procession in town, with the teacher in charge of his own pupils, and marched to the grounds. We did that for two years, and we found that the teachers rather objected to heading their pupils in the procession, and then we tried another scheme, and we have followed it for a number of years, and we are now sending tickets to every teacher within some fifteen or twenty miles to over forty schools altogether. We give to every one of these teachers a sufficient number of tickets in order to give one to each pupil in his school, and we give them free of charge, and this scheme gives general satisfaction. The pupils are all anxious to attend the fair, and they bring their parents with them and we know it has paid us in this way, and our board seem quite satisfied that, by giving free admission to the school children we are amply repaid by the extra number of adults who are brought to our fair.

Mr. Frank Metcalf, Blyth, Huron Co.: We have not introduced what might be called a school children's day. We have a good two days' exhibition, and it struck us some time ago that one of the desirable features of the fair should be educational. We heard from these fair associations and discussions through the press, the desirability of having, in connection with our fairs, expert judges. We could not get them from outside, and now we are trying to raise them of our own and we are doing it in this way. Some years ago we induced the board to offer prizes to the children for the judging of fruit. The board would not do it, and I gave the prizes myself to girls and boys under eighteen years of age who could correctly name the greatest number of apples on a table. The prizes were only $3, $2, $1, and in order to secure the first prize they were required to name, correctly, seventy-five per cent., for the second prize fifty per cent., third prize twenty-five per cent., and you would be surprised to see how many boys and girls were interested in the matter. They were scouring the orchards the whole summer, trying to find the names of the apples, and I can assure you that I have seen expert judges who would not come near these boys and girls, and we had good results. The parents were interested as well as the children, and I am endeavoring to induce the board to offer prizes to boys as judges of stock. We are going to ask the boys to come into the ring and judge, and give their reasons to the public for their judgment. A man does not complain so much if he does not get first or second prize, so long as you satisfy that man that he is getting fair play. Many a man has brought exhibits that were incorrectly named, and yet he was not told so, and could not understand why he did not get the prize. We are trying to crowd out objectionable features by introducing new educational features into our fairs.

Mr. Spence: How would you do with the ladies in the pastry department?

Mr. Walker, of Erin: As a member of the Erin Agricultural Society, I may say, we have adopted the plan of having, not a school day, but an educational day for the children, and we are giving prizes for the best exhibit made by any school section in Erin. We commenced doing this about four years ago, and we have found it to be one of the best educational parts of our work. The children of our section are busy getting some new thing ready the whole year, roots and seeds, and they have collected many things that I had never seen before which they have correctly named. I was so pleased this year with the exhibits they made that we had photographs taken, and I sent some down to Mr. Cowan. In one of our school yards there are fifty-seven different kinds of beets grown. At the exhibition they had grain threshed and in the straw, and fruit to no end—everything that was grown on the farm. And this work was all done by the pupils of the school section. The Erin society always has had a school day; children under twelve years of age are admitted free, and when these children grow up they come with their fifteen cents.

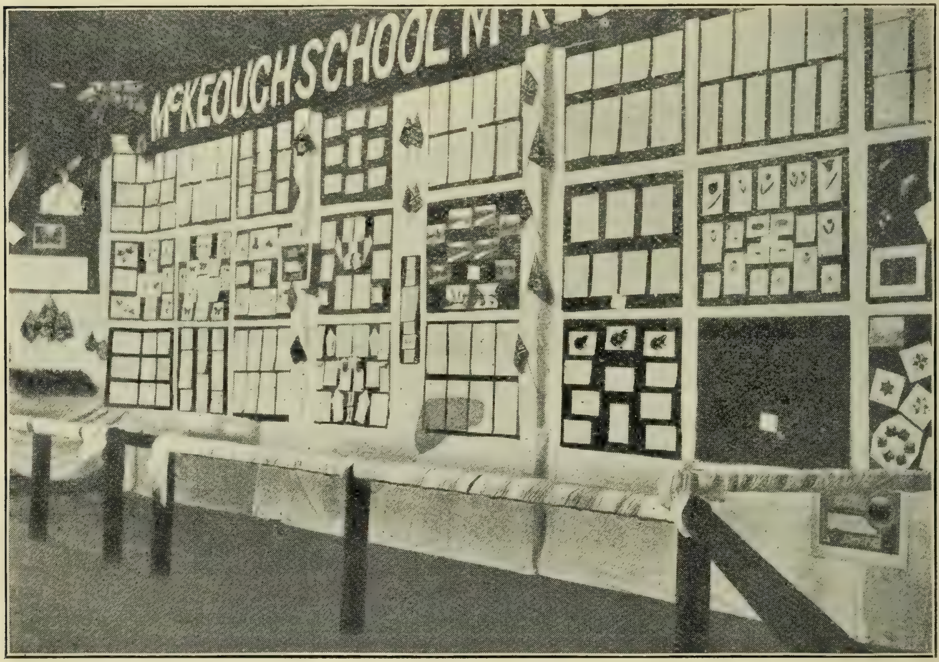
An exhibit of roots, and a collection of flowers, made by a class of school children, at Erin Fair.

Mr. Williams, Holstein, Ont.: In the township of Egremont we have held a purely agricultural show for thirteen years. The show has been in existence for thirty-eight years, and this year has been the best year we have ever had. We gave prizes three years ago for the best drilled squad of children. We gave prizes to the extent of $30. The first year we had five entries, and of course they all got prizes. The second year we had only two entries and they got prizes, but we found out it was not successful. One reason was that the teacher had to train the children during school hours, and the parents sometimes grumbled because it took up too much of their time, and the children had to be dressed, and that cost money. We gave prizes this year for the best drawing done by the pupils, and now we are going to try to have the boys do the judging and give reasons why. The farmer boys of this Province are going to be the men of the future, and we want to send these men to Parliament, like the Hon. Mr. Nelson Monteith. We do not want any more lawyers and doctors in Parliament; we want men of good common sense. (Laughter and applause.) I say the township society can exist without having horse races or side shows, and having nothing but a purely agricultural show. We have had it for thirty-eight years, and I am thankful that Erin has it also, because, perhaps the two will save the city. (Laughter.) We give no prizes outside our township. Over at

Flesherton, in East Grey, they have a very good show but they have another one within five miles of it. It is not a township show at all; it takes in two or three townships. We call our show a world's fair, and every boy and girl in the neighborhood attends, and some of the judges say that we have a show that is second to none.

William Channon, Victoria County: I am glad I am neither a lawyer nor a doctor. (Laughter.) I must say I very much appreciate the remarks made by the chairman this evening, and I understand the subject is school children. In reference to my friend's remarks about introducing judging for the boys the coming year, I think that is a splendid thing. I think the best way is to have the classes judged by the boys and then return the results to the clerk, and keep them secret from the other judges, and then have the judges go right along and judge the same class and not interfere with the boys at all, and I think that would be a splendid educational feature.

Mr. Thurston, Bobcaygeon: If we could get all the people interested in this work there would be no trouble. We did a little at this last year.



McKeough School Exhibit of clay and cardboard modelling, raphia work, drawing, etc., made at Chatham, 1904.

We gave prizes to the school children for some three years previous to this, for drawing and writing and collecting seeds and grains, and naming them correctly, and prizes for needlework to the girls. These prizes were given to children under fifteen years. This year we thought we would have an attraction at the show in the form of a procession, and we engaged a band and had the children take part; some of them were on horseback and others in carriages. We had two hundred children in the procession and we gave a flag to each child. Whatever you do for one you must do for all. It made a very nice display and the whole village was out, and the gate-keepers could not take the money fast enough after the children got inside. The proposition that we made to the children was that we would give them a free pass to the whole fair. The procession started from the village school grounds and we feel that we were amply paid. Next year we propose to go at it on a larger scale, I think we will have some songs, as I think that is much better than tight-rope walking. You must understand that when you put your hand on the boy's head you interest the father and mother.

A MEMBER: I am satisfied that there is not a person within the walls of this room but who is interested in anything our children are interested in. I think there is not a house that is the correct thing without children, and no fair is a success unless a good percentage of children are present. One of the principal things that brought me here to-night was the topic of school children's day. The great point for us is to find the best means of bringing the children into the fair and of giving them an interest in the show. We charge an admission fee of five cents, and I rather think instead of the five cents being charged we will put them on the same basis that has been stated by one gentleman here, and we will allow them to come in free. We give prizes for drawing and nature study, and the display that was made at our fair last year will compare favorably with the Toronto fair. I have heard people state that they had never seen a more creditable exhibition of nature study, and we hope that we shall have the pleasure of seeing the Minister of Agriculture there at no distant date, when he can see for himself the truth of the statement I am making. The fair with which I am connected lives within the letter of the law, better than seventy-five per cent. of the fairs. We have no horse racing or anything of that kind to attract the crowd; we can get the crowd without it, and our fair is not in a less progressive state.

A MEMBER: There has not been a single idea thrown out to-night that they have at any one fair or all of them put together that we have not incorporated in the work in Norfolk Union Fair.

MR. CRAIG, of Wellington: How long have you been doing that?

A MEMBER: It took some two or three years to work it out before we made a success of it. It is a matter of slow growth. If you enlist the services of your school inspector, that is the best way to work it out.

MR. J. T. MURPHY: It took us four or five years before we made a success of it at Simcoe and last fall we had all of it that we had room for.

MR. CRAIG: I am school inspector and have been fair secretary for eleven years, and the directors have given me a free hand in the matter, and I have done everything I could to make a success of the school children's day. For a time it worked well. This year it was almost a failure, and we gave prizes for nature study of $6 and $8. We have many girls and young ladies teaching, and they won't enter into competition against a man.

A MEMBER: It is not so with us; the lady teachers take right hold of it.

MR. CRAIG: In the township of Erin the teachers are wearying in the work, and the ones that competed last year are tired of the work and exceedingly doubtful as to whether they will take it up again.

MR. MCCREADY, Guelph: I am a representative of the school masters. I am a teacher of the nature study department at the McDonald Institute, Guelph, and we have a direct interest in the work of the agricultural societies, and I shall add to what Inspector Craig has said, that you have in this line of work imposed upon the school master, and the question for you to consider is, what are you going to do for the school masters for this, that you are demanding of them. It is a high class of work, because behind all your drills and nature study and the question of judging fruit and horses, is the teacher, who, throughout the year previous to your exhibition, has to give considerable extra work in preparing the pupils for this thing that is demanded by the agricultural societies. And if the work is going to be successful educationally, what they get at the fair must be worked over after they go back into the school, and unless that is done a great deal of it will come to naught. And I ask the agricultural societies what they are going to do to uphold the tendency of the times to improve school teachers' salaries?

Mr. Geo. Martyn, Six Nation Indian: I represent the Six Nation Indian Agricultural Society in the county of Brant. I am president of that society, and I feel that I cannot go away without making a few remarks. Our society has been in existence for thirty-nine years. I grieve very much that we have not had any experience of school children's day. We look upon these children as the ones who are going to take the place of those who are now doing the work. We offer prizes for penmanship and drawing, and for naming plants, and we have been doing that for a number of years. We have not yet had a school children's day, and we have come to this meeting to get some information on the matter.

AGRICULTURAL SOCIETIES AND THEIR WORK.

By H. B. Cowan, Provincial Superintendent.

Before taking you on a trip around the Province to show you, by means of lantern views, the work being done by some of our societies, I would like to draw attention to a few points that I feel we should not lose sight of in connection with our societies. We should understand what is necessary before we can have a successful agricultural exhibition. What I found while on the trip I took to the United States, as I told you this afternoon, gave me a pretty bad jolt, and I would not like to think that our societies twenty-five or thirty years from now are going to be in the shape that many of them are in the United States. If we are to continue on agricultural lines we must understand what is required, and I have made a note of a few things that I think are requisite to the conducting of a purely agricultural exhibition and a successful one.

The first thing is that your exhibition must be located in a good agricultural section. From what I can learn the exhibitions conducted in our cities or large towns are not as a rule our most successful exhibitions. (Hear, hear.) It seems to be a fact that when you try to hold exhibitions in the cities or towns you are almost sure to fail. They tried it at Pembroke, at Kingston and at Arnprior and failed. At Brockville and at Belleville and failed, and are trying it again. At Hamilton, St. Catharines, Brantford, St. Thomas and several other points, and they had to give it up, often being several thousand dollars in debt. You can go through the whole Province and find case after case where they have tried to hold exhibitions in cities and towns and where they had to give up the attempt. One reason seems to be that the immediate tendency, when you get an exhibition in the city, is to put on attractions to draw the city crowd. Gradually the farmers are put in the background and the exhibition neglects the agricultural features on which its success really depends. What is a successful agricultural exhibition? Is it to get out a big crowd of people who come together to have a high old time and go home without having learned anything, or to have a smaller exhibition with people who have come there to learn? We have a lot of societies of that kind, and that is the kind that the majority of you men represent, and I feel that is the class of societies that we want to encourage, and that we are here to encourage, and that is what the Government grants were given for.

The second requirement is that the section must have plenty of good stock. There are a lot of societies in the Province that are trying to hold exhibitions in sections where there is almost no stock at all. They are sure of their Government grant and they hold an exhibition without regard to whether they have the stock or facilities, and if you will look over your societies on these points, you will know just about how you stand.

Third, you must have a responsive community. There are a number of societies where the directors seem to be pulling at loggerheads with the farmers in the section or the people in the town. When the town people won't give them a hall for their meetings the directors get mad and everybody is fighting. Where that feeling exists it is impossible to hold a successful exhibition. Everybody must pull together in order to ensure success.

Then, of course, you should have a good board of directors, and you should have three or four men on that board who are hustlers. You will find generally that three or four of the men do almost all the work. You will find that the societies that are getting away from the agricultural features of their work are weak on some or all of these points.

Before our societies can be thoroughly successful we must have a good Act under which they can operate. The present Act is very defective. It has been unfair to many of our societies. It has helped to keep up societies in districts where there should not be any societies, and it has not been helping societies in proportion to the work they have been doing. This business of distinguishing between district and town societies is a mistake. A lot of men are hanging to that township idea, and I have an impression that when the Hon. Mr. Monteith gets up in the House to move his new Act, a lot of men will get up and tell him that they have got to have their township shows. The Province of Ontario and the State of New York appear to be the only places where they have tried to conduct societies on that line. The idea was to have a little show in each section, and that the people who exhibited there would go on to a bigger show, and from there to Toronto. The argument was that little shows are required to draw the exhibits out at first. It sounds all right, but it has not worked out that way. By giving a larger grant to a show in a poor section with poor directors you cannot make it as good a show as another with a smaller grant but in a good agricultural section and with hustling directors. And yet that is what we have been trying to do with many of our shows. I can quote you many places where the township societies are getting the smallest grants but giving more for agriculture than the district societies.

I would not want the district men to think that there is any intention to cut off the district societies. There is not. The grant will be made on the basis you have requested it should be, and the grant to some district societies will be increased. We have some excellent district societies, such as the Norfolk Union, and its grant will be away up, because it has been working purely on agricultural lines. We have got a lot of little bits of shows that are getting grants and that are not giving half as much for agriculture as they are getting. They tie their stock up to the fence corners and the money goes around to a few. There are a number of shows like that, and I would be surprised if a number of people in this hall do not know some of them in their own districts. These societies will die a natural death.

A Member: How are you going to stop them?

Mr. COWAN: I am inclined to think that when such societies are placed on the same basis as other societies and get their grants in proportion to what they give for agriculture that that will soon stop them. They have been able to hold exhibitions at those points simply because they have been getting fixed grants, and if they get their grants in proportion to what they do, they will have to go under or improve greatly. Some of the small societies however have not beeen getting their just share, and their grants will be increased.

A MEMBER: Can you define a small society?

Mr. COWAN: A society giving two or three hundred dollars in prizes I would call a small society. We have some that give only $75 or $100.

A MEMBER: Do you call a township society a small society?

Mr. COWAN: Some township societies are among the largest in the Province.

A MEMBER: Does the Industrial get anything from the Province?

Mr. COWAN: Not a cent.

A MEMBER: How are you going to determine the amount that is given for agricultural purposes?

Mr. COWAN: My own idea is, that it should mean money expended for the purposes covered in the Agriculture and Arts Act, including money expended on buildings.

A MEMBER: How are you going to depend on the reports that you get?

Mr. COWAN: That is why it has been proposed to appoint a Provincial auditor to check over these reports, and I think that would be one of the best safeguards. In Maine and New York they publish the reports of the societies showing how much is expended for cattle, sheep and swine, etc.

Mr. CHARLES: We publish it in Peterboro.

Mr. COWAN: It is not published so that the whole Province could see it. We have nearly five hundred societies in the Province, and it would require a small book to hold such a report, but I think such information would be valuable, and that it would pay to publish it.

A MEMBER: How could one auditor do the whole Province?

Mr. COWAN: He could not do it, but there would be no need of more than one, because there are a great many societies that turn in accurate reports, and the auditor would not require to go near them.

A MEMBER: How do you know?

Mr. COWAN: We know because we receive the reports at the Parliament Buildings. Of course, we do not know that they are accurate, but if they are published, the other societies would know, and if we had an auditor it would be possible to check the accuracy of reports thought to be fraudulent.

A MEMBER: If they made a return of the list of prizes you would know?

Mr. COWAN: In Maine and New York they check over the prize lists with the amount claimed to have been paid out, and in some cases they have found fraudulent reports in this way.

A MEMBER: Supposing I gave a grant of $5 for the best 20 pounds of butter, the butter to become my property, would you say that was a straight grant of $5 for agricultural purposes?

Mr. COWAN: My opinion is that a special prize in kind would not be allowed to count, but where cash was turned into the society, and the directors were allowed to spend that cash in any way they liked, it would be counted for agricultural purposes. I have touched on these points because I may want to refer to them later on when the views are being shown.

Mr. Cowan then gave a lantern exhibit of protographs that had been taken at different fairs throughout the Province, showing some of the very best fairs, their buildings, and the crowds on the grounds prize, rings, etc., and also some of the worst fairs in the Province, showing where cattle were tied up to the fences, poultry, pigs and sheep judged from the waggons, etc.

AGRICULTURAL EXHIBITIONS AND THE SCHOOL CHILDREN.

H. B. DONLY, Simcoe: I have been a member of our fair board for a very short time. I suppose we are all impressed with the idea that everything we do at fairs, no matter what it is, should be for the purpose of educating the people, and in order to do that we must use all the efforts we can to get people to come to the fair, and then give them instruction while they are there. We were confronted with this state of affairs in our county. We had extended the show from a two day show to three days, and we found we had only lengthened the agony without giving the people more than they had before. In other words the second day was largely a repetition of the first, getting together of exhibits and almost no gate receipts. People had been coming to the fair year after year, and we had not been giving them anything but a purely agricultural exhibition. We had no attractions, as they are called. We did not call in the aid of the ladies and gentlemen, who when they are not working at the fairs are generally to be found in the circus. We had not gone in for anything that might be styled horse racing, but I do not wish it to be understood that I am at all opposed to that particular branch of agriculture. The majority of our fair boards are opposed to holding horse racing as we see them at horse meets, and we were up against the proposition of having something in lieu of this to prevent our attendance from falling off. I think that was the motive that prompted our directors in going in for a school children's day, as we call it. The day is not exclusively confined to school children; we put on a programme of various features, but all of a local character; we do not hire any attractions whatever.

It took some time to educate the people up to school children's day. We found we had to get the sympathy of the public school inspector and to get him to go out among the teachers and school children and get them to prepare for the day, and we put on six events. One was simply the best attendance of a school in a carriage, for which we offered prizes of $15 and $10. Then we had three events of marching, giving prizes of $8 and $6 and another prize of $10 and $8. In addition to that there were prizes offered for calisthenic exercises. These exercises were not part of the curriculum of many schools. Last year this exhibition was seriously interfered with owing to the weather, but if we had good weather we would have shown you gentlemen who were there a very attractive programme. We offered prizes for nature study. Prizes are offered for collections of grain and injurious and beneficial insects.

More attention is being paid to this matter now than there ever was before. Our idea is to add as much interest as possible to these branches of school work by offering prizes, and we have tried to work along with those persons who are directly interested in education. The first year we got only one or two entries, but last year there was a creditable exhibit. It takes a great deal of hard work to prapare an exhibition that will be comprehensive. One school pupil had a collection of injurious and beneficial insects that must have run into the hundreds, and he had made this collection himself, and if we could get all the school children interested in such a thing as that it would be an immense benefit to the country. Some exhibitions only go so far as to ask their school children to give an exhibition of penmanship or something of that kind, the idea being to bring the school children to the exhibition. That may be a batter plan than ours, but I am in favor of the plan we are adopting. We have found school children's day to be a very beneficial feature. We also give prizes for running and jumping and things of that character, and we wind up the afternoon with jumping or horse-back sports for which we offer prizes. My advice would be that all those fairs that are looking for something new should try school children's day, and give it some consideration.

Mr. H. C. Hoar, Bowmanville: Were they school exhibits made by individual scholars or were the school represented?

Mr. Donly: Our rules allow individual scholars to compete in some classes, but for a marching display it must be by the school. One school might have an attendance of thirty or forty and other schools only twenty, and some thought that the schools in the towns would keep the rural schools out, and in order to prevent that we gave prizes for the different classes of schools. A school that had an attendance of twenty would not have to compete against a school that had an attendance of forty. We graded the schools and we gave prizes to schools in incorporated villages, and prizes for schools in towns.

School Children's Drill at the Simcoe Exhibition.

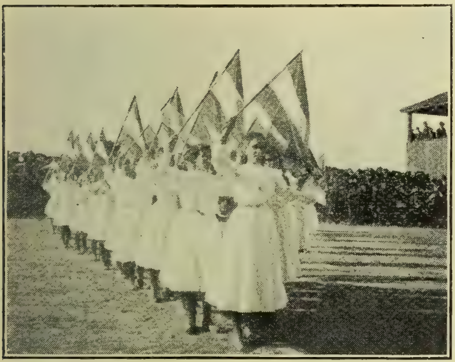
A Member: Did you charge the schools an entrance fee?

Mr. Donly: We issue tickets to the teachers and make it free to the children.

Mr. Riley, East Peterborough: I have been greatly interested in Mr. Donly's speech. I represent East Peterborough. We have what we consider a very valuable drawing card, and that is an exhibit of injurious weeds and seeds and we also have the plants, the same as the lecturers to the farmers' institutes bring around, and Mr. Newman, of Ottawa, who was up there two years ago examined the plants and seeds and he found very few mistakes. We give $35 in prizes for that exhibit.

Mr. Laidlaw, of Guelph: We have the most comprehensive exhibit of school children's work in the Province. Some of you have spoken about giving prizes for insects, and others about giving prizes for weeds, and a great many other things. We do all these. We offer over $200 in prizes for competitions by school children, and last year we had a building much larger than this room filled with school children's exhibits, and it was said by the school teachers to be the best educational exhibit they had seen, and professors from the Ontario Agricultural College said it was the best thing they had seen in Ontario.

Some six or seven years ago we began with the farmers' institutes, and I got them to hold in our district what we call children's institutes, and give illustrated lessons to the children in the schools. Last year we had fifteen or sixteen schools in our district compete, and I believe next year we will be able to put up such an exhibit as will not be seen anywhere else in Ontario. I think, if we can induce Mr. Cowan we will hold a model fair in Guelph that will be worth seeing. We have not found any trouble in the matter. We have 600 to 700 entries. One competition we have is the naming of different classes of fruit and birds and animals. We have a tent erected on the grounds and one class goes in at a time. We have an advantage over other sections in the fact that we have professors from the Agricultural College to help us.



School Children's Drill at Brussels Exhibition.

School Children's Drill at Brussels Exhibition.

I have had inquiries from a number of schools wishing to have our list to prepare next year for their own district. We get some of our city merchants to give special prizes, and the schools all get a half holiday. We do not have any parades or waggon loads going in, but we charge 10 cents admission and they are all willing to pay that fee and come in. Last year we had a manual training class from the city schools, and it was a credit to the children. We gave prizes for groups from each school in addition to individual prizes, so that it gives every school a chance and every individual a chance.

Mr. McCready, McDonald Institute: I wish to substantiate what Mr. Laidlaw has said. It was undoubtedly of the right kind, and if not entirely, it is well on the way to being a purely educational exhibition. I wish to emphasize the fact that I think you might be making a mistake in selecting a school children's day. I have no doubt that many of you may have an increased attendance, but I think it is a mistake. You can do the schools of the country a great deal of harm, and you may put extra burdens on the teachers that is not fair to put upon them, and I rise to urge that you hold in view in future, as far as you can, the welfare of the child in the first place, and the schools in the second place. When you consider having a school children's day at the fair, schools that make the best collections and get the prizes may be falling behind in educational work, there should be something else behind it, and there should be prizes for school children's gardens and gardens at their homes; see that the children keep the grounds around their schools in proper condition. These things are more important than the getting together of a fancy exhibition. I know of many cases where teachers are neglecting their studies for the sake of getting and retaining the reputation that is obtained at the fall fairs. Competition is keen and harm may be done. I think it would be better to have the prizes, not in cash, but in kind, a book or a subscription to some good paper, or a tree or a bulb or some such thing as that, that would be of value to the children and something that would spread over many years. You are doing a great work, and the most important thing at agricultural shows is the children, and the most important thing to consider in this country is the school master and his work.

School Childrens' Drill at Brussels Fair.

Mr. George Wilson, Creighton: This is a question I am very much interested in. This school children's day is the drawing card at the Creighton Show, and we have horse racing and balloon ascensions, yet the school children's day is the drawing card. Every school is expected to send in the name of their school to compete for writing and drawing. We let them all in free, because we think that every child that comes in free brings the father and mother, and it works very successfully.

The Chairman: Have you horse racing at your fair as well?

Mr. Wilson: We have horse racing.

A Member: I am against the idea of holding fairs just for amusement. I was glad to hear our friends, Mr. Laidlaw and Mr. McCready, laying down what they called advanced lines. We hold a clean fair; we haven't a track large enough for horse racing, but some of our people would like to have horse racing. They hold horse races at a fair near us, and the men go to the hotels and drink and bet and the whole thing is demoralizing to the children and to the people who engage in it.

A MEMBER: I have been president of our fair for twenty-one years, and I find the most important advertisement we have got is our school children's day. We think it is more important than horse racing, and although we have horse racing I am prepared to say to-day that I can draw more on the school children's day than we can for the horse racing. We allow the teachers and scholars to come in free.

The CHAIRMAN: The reason I asked this gentleman the question as to whether they had horse racing at their fair was to ascertain the fact as to whether they relied on that or the school children's day. Horse racing no doubt is contrary to the law of the Provincial Parliament, but Daniel O'Connell said he could drive a coach and four through any enactment that was ever put in the statute books, and I think the fairs of this Province have been doing it right along. The efforts that managers of fairs societies are contriving to secure in order to make their fairs a success are something extreme, and until we arrive at the point where grants from both the Government and the county councils will be made of such a character as to enable the management to drive from their fairs the objectionable features and horse racing we cannot expect that the managers will do it. They have to do everything they can to increase the financial results of their fairs.

I think the school children's feature has been well discussed, and I think this Association owes a vote of thanks to Mr. Donly for the way he has laid it before us this morning.

Moved by J. H. Davidson, President of Cobourg Central, seconded by Robert Vance, (East Durham): "That Mr. Cowan be requested to have his report printed in pamphlet form as soon as possible and sent to the secretaries of the different societies in advance of the regular report of this annual meeting, which we request should be issued as soon as possible."

The motion was carried.

The CHAIRMAN: The secretary has received a communication from the secretary of Thorold Association that this Association should pass a resolution that all grade males should be castrated. (Some laughter.)

The CHAIRMAN: I am pleased to have at my right hand the president of the Eastern Fairs Association, Mr. Field, of Brockville, and I am sure you will all give him a hearty welcome. The next thing on the programme is a special demonstration of keeping fair books by the secretaries of the societies.

Mr. MILLAR, Durham: We have listened to an able discussion this morning on one feature of fairs read by Mr. Donly of Simcoe, and I wish to move a vote of thanks to Mr. Donly for the able manner in which he has conducted this discussion, one of the principle things in connection with our fairs.

The motion seconded by Mr. Leitch, North Victoria, and carried.

NEW BUSINESS.

Mr. PIERSON, of Weston: I have no doubt there are other secretaries here who would like to have seen a demonstration of keeping secretaries' books. I would like to see if there is any better system than the one I am pursuing. I think most books could be filled out more satisfactorily and it would be much easier to make the Government Report.

Moved by GEO. E. LEE, Highgate, seconded by ROBT. E. COWAN, Galt: "That whereas each agricultural society is entitled to two delegates to the

Association of Fairs and Exhibitions; and whereas we believe it is in the best interests of agriculture and agricultural societies that each society should be represented, and equally represented at the yearly convention of this Association; and whereas all agricultural societies are not as favourably situated to Toronto, the place of the holding of the annual meeting, and therefore it necessarily is much more expensive to some societies to send delegates than to others. Resolved, that this convention amend the by-laws of the Association so that any society may, if they so desire, send one delegate who will carry two votes and fully represent his society in any business that may come before the convention."

The CHAIRMAN: The effect of that would be to give one delegate from each society a double vote. Are you ready for the question?

No. 1.—Sheep and swine pens of the Burford Society. There are 50 in all, 10x8 ft. each. This is the cheapest kind of pen. Considerable lumber is saved by using the fence as a wall for the pens. They do not afford protection from sun or rain but are much ahead of the custom of showing animals in crates on wagons as is done by some societies.

Mr. LEE: It was contended a year ago by our eastern friends that the expense was very high for them coming the distance they had to, and we find that it is quite a heavy expense for us. Our delegates last year cost us nearly $40. We had to leave home Tuesday, and it will be four days before we can get back home again. Societies that wish to send two delegates will be at perfect liberty to do so.

Mr. WALLACE: How would it be practical for a man to vote twice except by holding up both hands instead of one?

Mr. ROBERT E. COWAN: As seconder of this resolution I may say that it is not necessary to add a great deal to what has already been said. The motion explains itself. I believe it is desirable to have two delegates present from each association, but we agricultural societies that are at a great distance from Toronto would be at big expense in sending two delegates. I think it would be to their advantage to have this motion passed, especially for New Ontario and the eastern districts. The question came up yesterday when this Association endeavored to have the department pay part of the expenses of the delegates here present. I think this resolution would largely remove the necessity for so doing. The motion carried.

HORSE RACING.

Moved by **Wm. Channon**, seconded by **Johnson Ellis**: "That whereas there is a general desire by the public to have horse racing at the exhibitions of agricultural societies, and such races are now held under the guise of speeding in the ring; and whereas section 20 of the Agriculture and Arts Act which prohibits horse racing at agricultural exhibitions is practically a dead letter owing to the general desire of the public for such races; and whereas it is advisable that all laws should be properly enforced or repealed; therefore this Association respectfully request the Legislative Assembly of the Province of Ontario to repeal section 20 of the Agriculture and Arts Act, and leave the question of horse racing to be decided by each agricultural society for itself."

Mr. Channon: As mover of that motion I would just like to read in connection with that a copy of the Act. "It shall not be lawful to carry on any horse racing other than trials of speed under the control and regulation of the officers of the society during the days appointed for holding exhibitions by any district or township society at the place of holding an exhibition or within five miles thereof."

No. 2.—Swine pens of the Otterville Society. These pens, being built in the open, cost more than pens such as shown in illustration No. 1, but are very convenient for sightseers. In the pens here shown there is accommodation for 50 pigs. They cost $75.

Then in the second section we get. "Any person who is guilty of a violation of this Act shall be liable, upon summary conviction before a justice of the peace to a fine not exceeding $50 or imprisonment in the common gaol of the county for a period not exceeding thirty days."

It is very evident that we ought to live up to the law of the land, and it is evident that horse racing is being conducted by many of the agricultural shows in the Province. Those of us from the south riding of the county of Victoria feel that it is important that we should carry on horse racing. I feel that it is naturally educative, and if it is against the law, and we are in danger of being taken before a Justice of the Peace, and taken to the county gaol, I appeal to you that we should pass this resolution so that it may go before Parliament, so that they may have the true meaning and feeling of this Association, and I hope you will give the motion due consideration. I know, as far as we are concerned, it is one of the drawing cards to our association; by holding horse racing we are enabled to increase our prize list from year to year. We have a grand stand that seats 2,500 people, and it is crowded on both days to full capacity.

Mr. Ellis: As seconder of that motion I may say I am president of the South Ontario Society, and I think we have a right to be considered. I was offered $50 for the privilege of putting on a "wheel of fortune" on the grounds,, and I declined it. This same man that we turned away from the grounds can turn around and have us fined for having horse racing, and I do not think it is a pleasant position for the directors to be in.

A Member: Man is a peculiar animal. I happened to be president of the Farmers' Institutes of the county of Peel for the last two years and I have been connected with that institution for perhaps ten years as director, and I know whereof I speak when I say that man is a peculiar animal. There are men whom we want to educate, and they are the men that we cannot get at. I rise to put in a word of warning with regard to this resolution. I think we are travelling a little fast. I do not think we have any right to pass a resolution here that is going to take power from individual societies throughout this Province. We do not go to extremes in Bolton. We have a race track and we hold trials of speed, and all the horses that compete are owned by local men. We have got to have some attraction to keep the people there and something to draw them there. I think we have no right to pass a resolution to that effect. I think we have a right to be left alone to use our judgment in these things.

Mr. Channon: There is nothing in the resolution advocating any kind of attraction.

A Member: To my mind anything that is wrong under any circumstance is wrong under every circumstance. We have all agreed upon this point from the argument set forth yesterday, and to which we listened with a great deal of attention, that horse racing in every respect has a demoralizing effect upon every society or class of people who patronize it. (Cries of "No," "No.") Just wait until I make myself clear on what I have to say. I say that horse racing has a demoralizing effect and it is followed by parties who are of questionable character. (Some Cries of "Never." "The best characters in the land.")

The Member: Not always. I say as a rule horse racing is followed by parties who are of questionable character. (Cries of "No," "No.") What is considered wrong in one case must be wrong in another. If it is wrong to have horse racing, why in Heaven has the Government placed itself in such a position that we are in doubt as to what they mean with reference to this horse racing. Why is it that they allow directors to put on speeding in the ring? What is the difference between speeding in the ring and horse racing? If horse racing is to be approved of by these organizations and commended by it, can anyone in this audience tell me why they put it under such a heading as speeding in the ring? Why do not they come out plump and square and say horse racing is demoralizing?—and any person who takes up this work will find it is so. Why is it they have to put it under the heading of speeding in the ring if there is not something questionable behind it? What I think would be the proper thing for this organization to do is to have the Government put itself on record, so that there will be no question whatever as to what the meaning of horse racing is. If we are going to have horse racing let us have it full and free and above board and with everything that is associated with horse racing. If it is a matter of speeding in the ring, let us know what it means. No director should be placed in the humiliating position of being subjected to the whim of any person who is liable to come before him and bring him before a magistrate and make him pay the penalty. This Association should know beyond doubt what it is permitted to do with regard to horse racing, and what I still maintain is this, that if it is right for one society to have horse racing, it is perfectly right for the other societies to have it. We have a fair, and there is another fair fifteen or sixteen miles from it, and at our fair we do not allow horse racing at all, and we have as good a track as there is in the country.

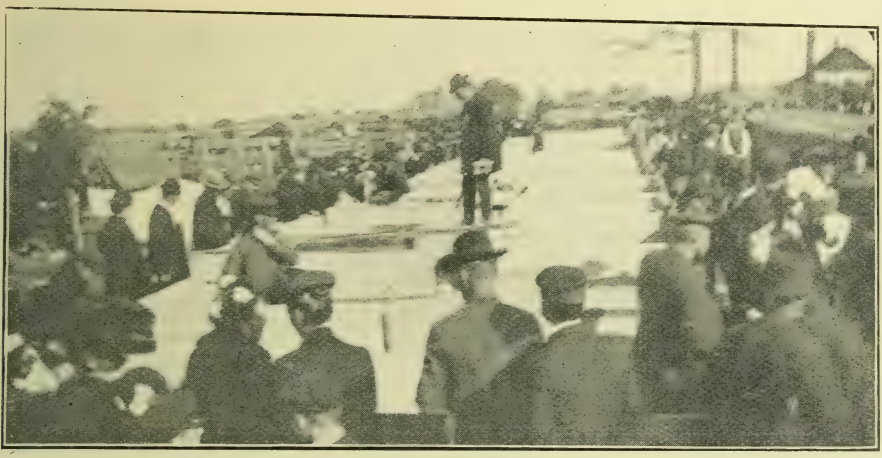
A MEMBER: You have no horses?

Another MEMBER: Have you speeding in the ring?

The MEMBER: Yes.

A MEMBER: Does the horse that comes in first get the prize?

The MEMBER: No. Last year we had speeding in the ring. (Great laughter.) The horse that came in first was a quarter of a mile ahead of the others and he did not get the prize.



No. 3.—General view of the sheep and swine pens at the Sarnia exhibition. There are 100 pens in all; 10 for sheep, that are 12x16 ft.; 50 that are 8x8 ft., and 40 that are 6x8 ft. Figures of cost not available. When societies that have pens, like those shown in illustration No. 2, need more accomodation expense is saved by backing the new pens against the old ones, thus saving lumber. The man on the pens is one of the Department's judges who found his work difficult as there was no provision for driving the animals out for purposes of comparison. These are good, servicable pens.

A MEMBER: Because he was a ringer?

The MEMBER: No, he was not a ringer. (Cries of "Question.")

The MEMBER: The other town is about fifteen miles from us and they have horse racing in every sense of the word, and some of the members of the Government were there and witnessed it.

Mr. PRICE, Aylmer: I take great pleasure in supporting this motion, for no other reason than the fact that I believe the directors of the different agricultural societies throughout this section of the country are men who are capable of judging what is best for their own section to make the fair a success agriculturally than any other person is. (Applause.) I may say that on our board out of thirteen active members ten of them are farmers, and as good farmers as can be found in the country (applause), and I am sure they have an honest interest in agriculture and they take a great interest in the fair, and they introduce nothing of a questionable character, and our fair is unique in its history.

THE AYLMER FAIR.

Supt. Cowan: Mr. Price represents the Aylmer Fair and he has got figures and facts at his fingers' ends that should interest you. I hope that you will listen to him carefully.

Mr. Price: We found our fair a few years ago in 1897 in such a condition as possibly some other fairs are in at the present time. That is that we could not get the people interested. We could not get the crowd. They would not come out; it had been tried in the city of St. Thomas, and they made a failure of it, and the fair had to come to Aylmer, a small town of 2,300 people, and when we undertook the fair the question was: How to make a success of it agriculturally? We started out with the idea that it could be done with races and attractions. We are one of the fairs that never call horse racing speeding in the ring. (Applause.) When we came to this Association some four or five years ago, and I had the honor of making a short address on the question of attractions, one gentleman got up and seemed to be thunder struck that I would have the audacity to speak on speeding in the ring as races in the presence of the Minister and Deputy Minister. However, we have always been out, flat-footed, square and open, and we never made any question of it, and I say right here that if there are societies like the one in Simcoe who are making a grand success of the fair without attractions and races, I would not ask them to change. I would advocate that they should stay right where they are. But where societies are up against it like ourselves, and cannot make it a success in any other way, then I say put on the attractions and races, and I will tell you what our fair has done and how it has worked out.

No. 4.—The swine pens of the Almonte Society. Cost $600. Pens of this kind are the next step in the evolution of pens like those shown in illustration No. 1. These pens afford protection to the stock from rain and sun.

1897 was the last year in which we ran a fair without any attractions. I think it is fair to put the money we receive over and above what we would receive without races and attractions against the cost of the races and attrations. In 1897 we were running a little two day fair and to-day we are running a five day fair, day and night, and at the same time we have built up grounds which I think Mr. Cowan will tell you for their size are second to none in Canada. We put the receipts from the gate at nights, from which we could not possibly receive a dollar if we had not any attractions, and from the grand stand from which we could not receive a dollar if it were not for the attractions in the day time, against the cost of our attractions and races, and to show you how it works out I will read you a few items.

The total gate receipts in the day time in 1905 were $829.15. Total receipts at night $354.20. In other words we took in nearly half as much from the gate at night as in the day time, and you must remember that we are only a small fair.

A MEMBER: What is your programme at night?

Answer: Clean vaudeville performance in the open air.

The total receipts from grand stand in the day time were $237.50, at night $259.85. We took in $22.35 more from the grand stand at night than we did in the day time. For the first two nights we charge 10 cents and for Wednesday, Thursday and Friday we charge 25 cents. The total receipts day and night were $1,183.35. Grand stand $483.40. We received nearly half as much from night as day time. Total receipts from the grand stand in day time $1,064.70. Our total receipts from gate and grand stand at night were $612.05. More than half as much at night as we had in the day time.

As regards the races last year we offered in prizes $460. I might say that we have often offered a good deal more than that, but they do not always fill up. Last year all the races did not fill up, and we had running dashes, and some trotting races, and after deducting the entrance fee which we received from the race men our races cost $164. That is all it cost us.

As regards the attractions, we made a contract last year with an amusement company of New York to place the programme for $450. They were to pay all expenses and we had nothing to do except to give them a check for $450, at the conclusion of the fair, if satisfactory, and they put on a programme that would last two hours. We made it clean, there was no leg show. There was balancing, etc., and moving pictures at night.

A MEMBER: How many nights?

MR. PRICE: Five nights and an afternoon as well. Three afternoons and five nights. The total receipts of the gate and grand stand at night only were $612.05. Our attraction cost us $450 and piano and pianist $26 making a total of $476 so that from the night proceedings only we paid for all our attractions and had $136.05 to the good. We could not have got one dollar from the evening show if we had not these attractions. The total receipts from the grand stand were $493.40. Gate at night $354.20; total $847.60. The total cost in every shape and form of the races and attractions was $640. So that we paid for our attractions and paid for our races and had $207.60 to put to the agricultural part of our fair after we got through.

A MEMBER: And had lots of sport?

MR. PRICE: We illuminated our grounds with electric lights. We had the arc system and the incandescent. But I think next year we will dispense with the arc system altogether and use only the incandescent. Light and water cost us last year about $124. We had a lot of wiring to do that we will not have to pay for next year. In 1897 we ran the show without any attractions, and we received for membership fees $506, and we had to canvass for that, and we had to beg people to join and give men ten per cent. commission to go out and get members. Last year, without canvassing or asking a man for a dollar, we received in membership fees $1,053.56, and that was largely made up from people who would not join the fair until we had attractions; young fellows around town and from the country who go in and get a ticket and take their girl in in the day time and at night. In 1897 we received for booth privileges $82.50 and last year we received for booth privilegs $243.21.

Last year we had a dining room on the grounds. We made arrangements with the Ladies' Aid Society of the Methodist Church, and they gave a good 25 cent dinner, and we gave them the use of a building and the privilege of using the grounds, and we supplied them with electric light and water, and put in a stove for them, and we took 25 per cent. of the total receipts, and we received $72 as our share of the revenue. Of course a good deal of the stuff they used was sent in by their friends around the country, but after they got through they had a clear profit of $175, so that it paid them and it paid us.

In 1897 we offered in prizes $1,043.25, and last year we increased that amount to $1,748.30, so that you can see we did not neglect the agricultural end of the show. There has never been an educational feature that we have not adopted. We are just as anxious to have the agricultural end keep up as any other fair. In 1897 we paid in prizes $759 and last year we paid $1,290.90. In 1897 our receipts from the gate and grand stand were $693.58, and last year they were $1,676.75. The amount that we offered in prizes for agricultural exhibits was larger last year than any other year in the history of the fair. As I said before, I would not recommend you to change, but if there is a society that is not doing good work or that is going into the hole, I advise you to look into the figures and facts I have given you, and if you will do that I feel that what little I have said will not have been in vain.

No. 5.—The sheep pens of the Orillia Society. Pens of this kind are constructed on the same plan as those shown in illustration No. 4, (using the fence as the back wall) but are more neatly built and, of course, cost more. Figures of cost not available.

A Member: What kind of races do you get for $450 that you can spread over five days? We give from $700 to $800 for one day in races, and we do not get more than enough to make one good day's races, and we have a good reputation with the horsemen. I cannot understand how for $450 you can get horses enough to spread over five days?

Mr. Price: We attempted when we first started to have races every day, and we used to give between $1,200 and $1,300, but we found that it did not pay, and we found that it was doing exactly what we did not want it to do. It was making the fair more of a race meet and detracting from the agricultural side of it; and we began to take off the races on some of the days, and last year we confined the racing to one day. Monday and Tuesday were more like opening days and then Wednesday we had the races. We get the performers for the night show for the same price that we would have to pay if we had them in the day time only.

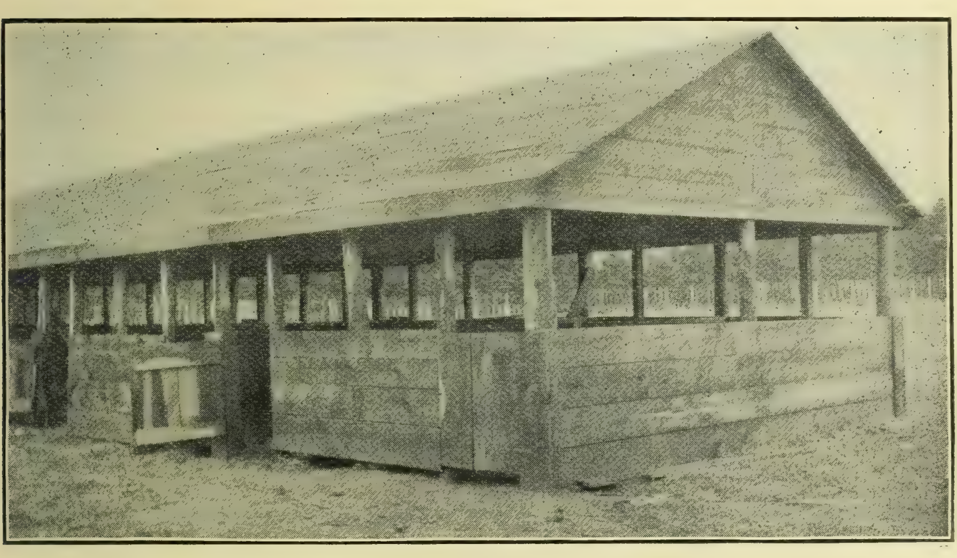
We have a school children's day something the same as they have in Simcoe. Of course there is kicking by some people, but I think we are doing what is right, and we are perfectly satisfied.

A Member: Do you allow pool selling?

Mr. Price: Nothing in the way of pool selling or gambling of any description. It is impossible to prevent little private betting. People will pool straws as to which horse is going to win, and you cannot stop that kind of thing, but I never saw a dollar bet on our fair grounds.

A Member: Do you stop horse racing on school children's day?

Mr. Price: Yes, because we want to make school children's day stand on its own footing, and give the children the full benefit of that day. You cannot have racing on school children's day and bring the people there, because there would be danger to the children in crossing the track. We must have all the school children's sports on the track, and we cut out the races for that reason.



No. 6.—The sheep and swine sheds of the Woodstock Society. Note the door to each pen. This shed is 16x168 ft. and cost $300. These pens, having a roof, are an improvement on those shown in illustration No. 3.

A Member: Would this gentleman give us a definition of what horse racing is? The only money I ever lost betting was fifty cents which I bet on a Clydesdale team drawing, and I would like to know what the sinful part of horse racing is?

Mr. Price: I would not undertake to answer that question.

A Member: At what time of the day do you hold horse racing?

Mr. Price: In the afternoon. We run the afternoon show in this way. We will have one heat, say at one o'clock and at 1.15 we will call out carriage horses and then after they have been shown we will put on a heat, another race and then another class of carriage horse. We have a good, big band playing on the grounds in front of the grand stand, and we have special attractions going on all the time.

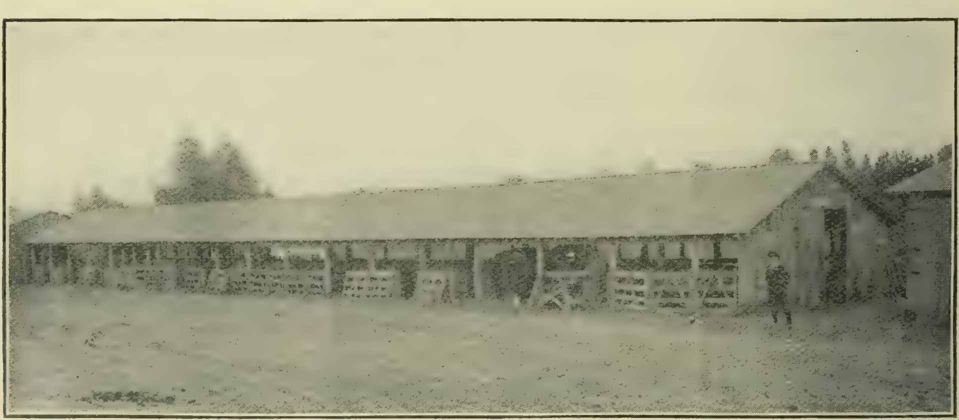
A MEMBER: Don't you think that would take the place of your vaudeville performance in the afternoon?

MR. PRICE: It might, but it does not cost us any more to have it in the afternoon as well as at night. Some people will go there and say they would not give a cent to see the races and others want to see them and we have both, and our patrons have a good afternoon.

A MEMBER: Do you display your carriage teams on the same track as you have the races?

MR. PRICE: Yes, right in front of the grand stand. The population of Aylmer is about 2,300, and for the night programme we have as large an attendance as we have in the day time. The people come and pay twenty-five cents in the morning and get their dinner on the grounds and stay for the night performance.

MR. CHARLES, Peterborough: There is some good in the worst of us, and some bad in the best of us, and it does not behoove any of us to speak ill of the rest of us. (Laughter.) I object most strongly to these insinuations about horse racing being demoralizing. I do not like to listen to it. It sounds hypocritical. I do not want to go on any further committing illegal acts. If it is wrong to have this horse racing let it be stopped. The Government should not wink at it, and we should not be put in that position that any fellow in the town can bring a director up and have him put in gaol. (Applause.) Any man who conducts an exhibition or a show cannot please everybody. Somebody is bound to be dissatisfied, and sometimes I find it is the awfully goody, goody people who do the most harm. I want to back up this resolution as far as I can and I think the Government ought to put it in such a way that associations should be allowed to conduct their fairs in the best interest of their own district. (Applause.) You can prohibit any of these indecent shows. No decent people will have them—put them down; but to say that horse racing is immoral—I think the man who says so is an evil thinker. (Applause and cries of "No.")



No. 7.—The sheep pens of the Barrie Society. Cost price not available. Note the passage down the centre. This is an improvement on the pens shown in illustration No. 6, as in rainy weather there is protection for the spectators.

A MEMBER: I fully indorse what the last speaker has said. I can sympathize with every word he has said, and I maintain and have maintained ever since this question was first brought up that racing and trials of speed are one and the same thing, and I think we should have horse racing so that we can get the best out of our horses. No horse buyer will give a premium for a horse unless he is educated up to a certain degree, and I maintain that the fair ground is the place to do it. (Applause.)

A Member: There is no man in the room who is more fond of horses than I am, but I ask, what is the history of horse racing? How many good men has it sent to the wall? The Government is going to be asked by this Association to repeal that law in regard to horse racing, and I say to you that you should be careful what you are doing.

The Chairman: The resolution does not indorse or repudiate the question of horse racing, it only memoralizes the Government to allow each society to decide the question. All those in favor will please stand up.

The motion was carried almost unanimously.

THE HORSE RACING SITUATION.

Supt. H. B. Cowan: I am glad that this discussion about horse racing has taken place. I have attended these meetings for years and in the past we have been afraid to grapple with this matter. It is a question that will not down until it is settled right, and if we want to settle it we must do so in a right and proper way, and before we can do that we must thoroughly understand the situation. It is one of the most troublesome questions that the Department has had to grapple with for some years, and the trouble is that the views held in regard to it are so radically different. The two sides of this question may be compared to oil and water; they will not mix. The reason is because some men have made a success of their exhibitions without horse racing. These men cannot see why other societies cannot do the same. On the other hand there are other societies that have tried to conduct their exhibitions without horse racing and have failed, but after putting on horse races they have increased their receipts and, thereby, their prizes. They are, therefore, convinced that they cannot hold a successful exhibition without horse races, and in some cases without special attractions as well. Both sides are convinced that they are right, and in the past a great deal of time has been taken up at our conventions by men who have essayed the impossible task of trying to convince those who do not agree with them, that their views on this subject are the only right ones.

We must look at this question on broader lines. When I became superintendent of fairs I must confess that I was rather prejudiced against horse racing. In the section from which I came most of the exhibitions had not held horse races and they were successful, and I did not see why all societies could not succeed in the same way. Visits paid since then to different fairs in all parts of the Province have served to convince me that there are many exhibitions that would fail were they conducted on purely agricultural lines. The acquaintance I have made with such men as Mr. Price, of Aylmer, and Mr. Field, of Brockville, has convinced me that many of the men who are in favor of holding horse races at their exhibitions are not interested in horse racing personally, but that they are honest in their views that it is necessary for the success of their exhibitions that they shall hold horse racing and special attractions at their fairs, and that they are working in the best interests of the farmers in their sections when they introduced these features at their exhibitions. The fact is that most of us, if we were connected with their societies, would act as they have done in the management of their exhibitions or give up the shows altogether.

Now take the case of the Aylmer exhibition. Horse racing and special attractions, as Mr. Price has proved, have enabled the directors to greatly increase their prize list. Experience has convinced them that were they to attempt to conduct their exhibition without special attractions and horse racing it would be a failure. There is no use in trying to pass over that fact and there is no use in those who favor purely agricultural exhibitions trying to convince a man like Mr. Price, and his board of directors, that their exhibition could be conducted on purely agricultural lines.

While this is all true I am convinced that a society that finds it necessary to introduce special attractions is defective in one or more respects. Were such a society located in a strong agricultural section where the people are thoroughly interested in agriculture, where there is a good stock, and other exhibitions are not too close, it should be possible for the directors to conduct their exhibition on purely agricultural lines, as is being done by a large proportion of the societies in the Province. Where these features are introduced it is a practical admission that the agricultural element in the section is not strong enough to support an exhibition of the dimensions planned. This, however, does not get away from the fact that by putting on these special features societies sometimes are able to give more for agricultural purposes than they otherwise could.

Last fall the Department made an effort to ascertain how many of the societies in the Province are conducting horse races. A circular asking a number of questions was sent to all the societies. They were asked if they considered horse racing necessary for the success of their exhibition, and the amounts they paid in prizes. As far as I can find out, speaking from memory, we have about 160 societies out of slightly over 400 in the Province that are holding horse races. Most of the societies in northern Ontario do not hold any. The amounts offered as premiums in horse racing amounted to slightly over $26,000. A number of societies offered small purses of from $25 to $75, while on the other hand several offered prizes aggregating considerably over $1,000, one society offering as much as $2,000. The average amount offered probably would be from $150 to $200.

You have passed a resolution expressing your belief that each society should be allowed to deal with this question for itself. The danger is that if this is done circumstances over which they will have no control will gradually compel societies to go to extremes, as has been the case in the States. A society at the start may intend to give only a small sum for special attractions but as other societies increase theeir expenditures in this direction it is forced to do the same. That this is a real danger is shown by the fact that we already have societies, as I stated yesterday, that are spending more for horse races and special attractions than for all agricultural purposes combined. The proportion of such societies is likely to increase unless great care is taken.

You will see from the figures I have just given that there are between 200 and 240 societies that are not holding horse races and are conducting their shows on purely agricultural lines.

A Member: Would not a large proportion of these exhibitions be held in places where they could not pay a premium for horse races?

Mr. Cowan: As already stated, a considerable number of these societies are in New Ontario where the crowd is satisfied with a small fair on purely agricultural lines. The great proportion of them, however, are in older Ontario and have to face the same conditions as the other societies.

Right here is where I am convinced that it is the societies in the cities that are forcing this problem to the front. They, more than any others, are inclined to go to extremes in horse racing and special attractions, because a large proportion of those who attend their exhibitions are not interested in agriculture and demand that they shall be amused. Thus city societies, by introducing these features at fairs, are forcing other societies to do the same.

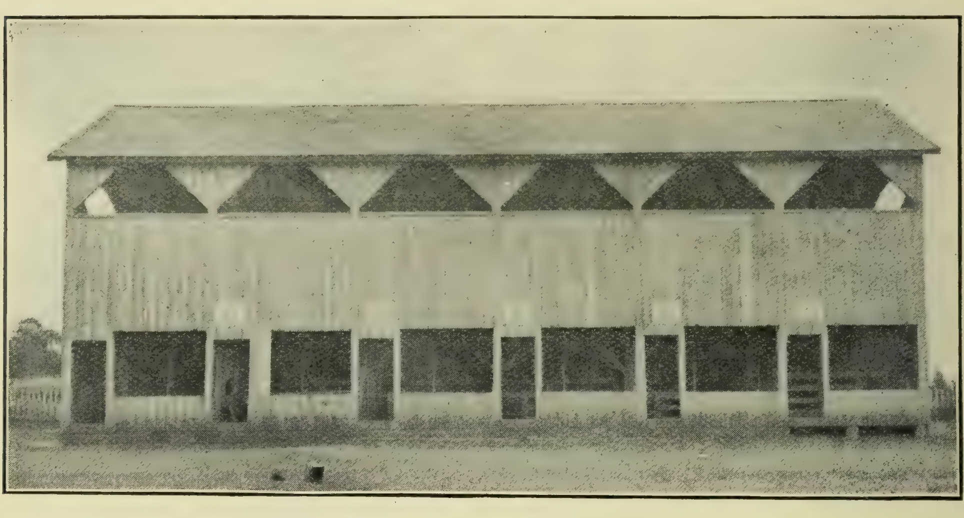
While the present law in regard to horse racing has not been an entire success, I am convinced that it is largely responsible for the fact that our societies, as a whole, have been doing as good work as they have. While many societies have ignored the law and have held horse races, a very large proportion have respected the law and have not introduced this feature.

There is, therefore, every reason to believe that a much larger proportion of our societies would have been holding races and that the value of the work being done by our societies as a whole would not be nearly as great as it is had it not been for this law. Even as it is the farming community is not satisfied with the work being done. You all know that during the past few years the agricultural press has frequently expressed the view that a large proportion of the funds expended by our agricultural societies are practically wasted, and some have gone so far as to recommend that the grant of $80,000 which the societies receive each year should be discontinued or greatly reduced. Much the same views have been expressed at representative meetings of farmers. In this connection it has been pointed out that the grant to agricultural societies is much greater than the total grant to Farmers' Institutes, to the Dairymen's and Fruit Growers' Associations, the Winter Fair at Guelph, the Fruit Experiment Stations, Dairy Schools and several other lines of work. It is believed that the societies are not doing nearly as much good with their grants as these other branches of farm work that are receiving a smaller total grant.

No. 8.—The swine pens and feed building of the Richmond Agricultural Society. Note how they have been improved by being white-washed. The feed building is 14x 15 ft. In it is kept the hay, grain, bran, etc , that is sold exhibitors. The open space between the buildings is used for unloading sheep, swine and calves. The society has also a movable truck for unloading animals. The swine pens are 34 in number, 5x7 ft., 17 on each side. The building is shingled, strongly constructed and cost $400.

I have been trying for some time to find some sort of simile as regards the effect of horse racing on societies and the only thing I can liken it to and I hope my remarks won't be misconstrued is, the effect of drinking on men. Many men drink all their lives, and show no ill effects from it, and they claim that drinking has been a benefit to them. Other men, once they start drinking, soon go to the dogs. On the whole, it is generally admitted that drinking has a more or less lowering effect on those who indulge in it. Much the same can be said in regard to the effect of horse racing on our societies. Some hold horse races for years and are able to prove that they have been benefited by them, other societies introduce this feature, run to extremes and are soon ruined. Once horse racing is introduced a certain element begins to leave the fair and another, generally an undesirable one, to attend in greater numbers. On the whole the introduction of horse racing tends to awaken the agricultural features of an exhibition, as is amply shown by the conditions of the fairs in the states.

In the great majority of cases societies start off with just a green race or a farmers' trot. After they have had this kind of a race for a while they want something a little faster and they put up a purse. Finally some fast horses are developed, and as no other residents of the district care to compete with them the events are thrown open to the fastest horses in some other district; each year the tendency is to outdo the year before, and the purses are increased until finally the society becomes more or less of a race meet. The men who are interested in fast horses are clever men, and once they get into a society, as many of you here know, they get a grip of its affairs that it is hard to loosen and the farmers are gradually shoved to the wall. We must take great care to see that that element does not get the control of our societies.



Some societies use the back of their grand stands for dining rooms or stock pens. The back of this, the Owen Sound grand stand, is used for sheep pens.

While it may not be feasible to try to stamp out horse racing from our exhibitions entirely, I do not believe we should throw the door wide open for the unrestricted development of this feature at our exhibitions. In my opinion it is in the best interests of the horse racing men themselves that this should not be done, because there is reason to believe that if horse racing is carried to extremes the dissatisfaction now frequently expressed with the work of the agricultural societies will grow until the public will demand the withdrawal of all Government grants, and that ultimately no grant will be given as is now the case in New Hampshire, Pennsylvania and other States.

In talking with Mr. Pearce, of Vermont, a member of the State Legislature, who is also president of an agricultural society that holds horse races, and who is endeavoring to induce his State to give grants to the agricultural societies, he informed me that one of the greatest difficulties he is meeting with is the fact that societies have gone to extremes on this line and the public will not support the Legislature in giving them grants. We should recognize this fact and take it into consideration when discussing the matter.

What is the position of the Department of Agriculture? We have many societies that are expending practically every cent they raise for agricultural purposes. We have other societies that find it necessary to spend say $1 for horse racing and special attractions out of every $3 they raise. Which of these societies is making the best use of its funds? It practically means that when the Government makes a grant to one society every cent of the grant goes for agricultural purposes, while with the other society one-third of the grant is devoted to horse racing and special attractions. Is it not right, therefore, that the Department should endeavor to support those societies which use their funds to the best advantage?

I do not say that we should cut off societies that are holding horse races, but I do feel that we should keep in front of us all the time the fact that our societies were established for the benefit of agriculture, and that we should do our best in every way to keep our societies working along the lines for which they were created, that our societies as a whole may do a still better and greater work to help the agricultural industry—the greatest industry we have. (Applause.)

A UNIFORM SYSTEM OF FAIRS BOOKS.

The president having called the meeting at the afternoon session, February 22, to order, it was moved by W. E. Stock and seconded by J. M. Knowles: "That we, the delegates present at this Fairs Association convention, think that it would be advisable for the Government to appoint a Provincial auditor of fair books." Lost.

Mr. Stock: My object in moving this resolution is, that we may discuss it and bring it to a final conclusion. I think we are beginning to know where we are at. I have had some experience in the matter of municipal audits, and you sometimes come across a set of books to audit that are very difficult, on account of the way they have been kept, and if we appoint an auditor I believe we should have some uniform system of books to be kept by the treasurer. Every municipal treasurer has a certain set of books to keep, and Mr. Laing, the auditor, can examine them very readily; and if we had all the fair books in the Province kept in the same way an auditor could go to work and audit them much more satisfactorily. I move this motion simply for the purpose of bringing this matter before the people.

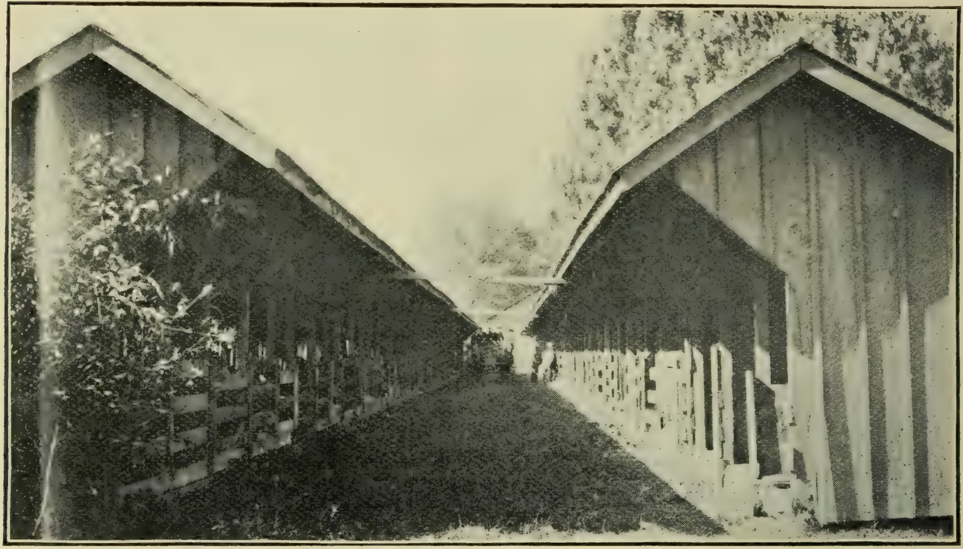
The Chairman: You are all aware of the system provided by the municipal auditors, the most important part of this motion is recommending the appointment of an auditor of fair books for the Province.

A Member: Some people might approve of appointing an auditor, and not approve of having a uniform system of books. Do you think we can get one set of books that can suit everybody?

A Member: Would it be compulsory that all books should be audited by the Provincial auditor?

The Chairman: Mr. Cowan explained yesterday that there were so many fairs it would be impossible for the Provincial auditor to reach them all and he would only reach those delinquent societies that were not making their reports promptly.

A Member: I think there should be some better system adopted than the one we have now. The Farmers' Institutes are all furnished with a uniform set of books for the Province and the entries are all the same and I think the same plan might be carried out with regard to the fairs.



The handsome and comfortable sheep and swine sheds of the Collingwood Society. Cost not known.

A Member: I think the resolution is all right, and I think if the Government takes hold of this they will give us a uniform system.

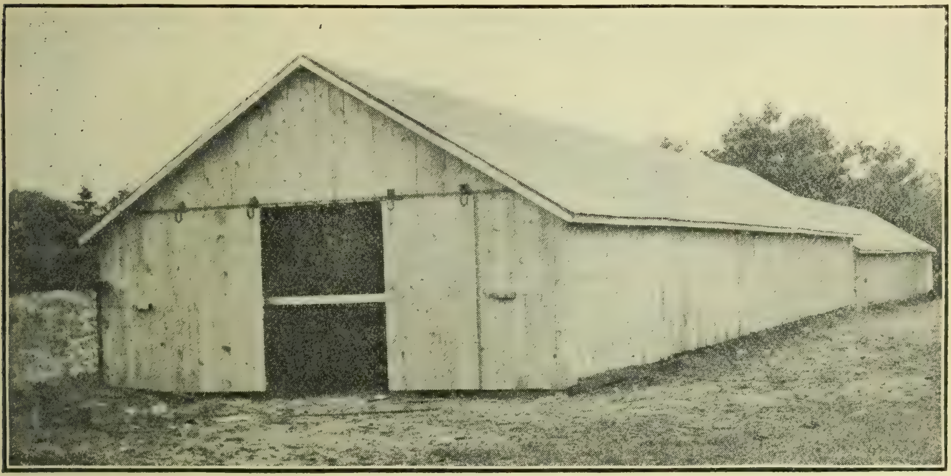
A Member: I know something about bookeeping. At the present time I am treasurer of some four or five societies, including the agricultural society, and that is the only society that does not give us a book that is systemized. Every other society gives you a book prepared for placing down whatever entry you want to make and an audit can be very easily made from them. The moment we get a proper system of bookkeeping we will get the books from the Government at a nominal price, and we can send these books to the Government and they can easily look over them and see that they are right. I have one book that covers ten years, and I can turn up at any time and give day and date, and get just what I want.

A Member: You said you kept a book that lasted ten years, what did you mean by that, was it just a cash book or do you mean the ledger?

A Member: In this system probably three or four years would be enough. I am not going to tell you the kind; that would be detail, that could be arranged afterwards. We know very well that all societies, except the agricultural society, have a systemized form of bookkeeping and it works well. If you were to issue a new book yearly it would not be as satisfactory.

Mr. GAINER: I think the main point is to have the treasurers' books uniform throughout the Province. In some societies the secretary and treasurer hold separate offices, but I think the main thing is to have the treasurers' books uniform throughout the Province.

Mr. LAIDLAW: According to the Agriculture and Arts Act, Section 5, the Minister of Agriculture has power, at any time, to appoint a person to inspect and audit the books of any society, and that is all we want. We have heard that there are a few societies that do not keep their books correctly, and all that is necessary is to ask the Minister to appoint a man to audit them and he can do so. All that you want to do is to keep the cash book correctly. I always keep my books so that you can tell how much is received for entrance fees, how much for subscription, and how much for prize lists, printing, etc. I do not think there is anything very difficult about the matter. Of course, I think the Government might suggest a nice handy form in which to keep the books. I do not think you could have a uniform system of entry books. This gentleman just spoke about keeping a book for four or five years. I do not think you could go on with the same old thing for four or five years. You have got to have different classes every few years. As long as you keep your entries correctly I think it is all right. I have been secretary for sixteen years, and I do not think that during any of that time there have been half a dozen inquiries after the show is over to look at the books. If the Government would issue a plain set of books, it would be all right, and we could follow them.

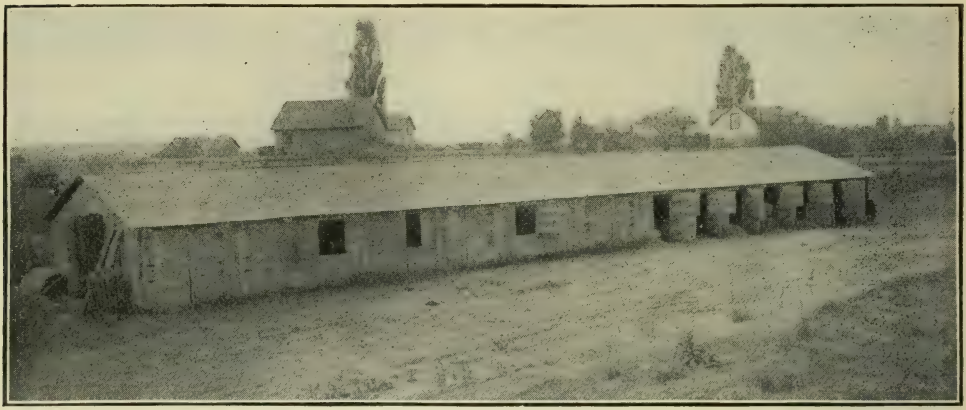


A.—Horse stable of the Woodstock Society. Size 40x136 feet, estimated cost now $1,000. A more expensive but a convenient building is one that has doors, from the outside, into each stall. See illustration B.

Mr. HYATT: As I understand the legislation, I do not feel like giving it my support.

The CHAIRMAN: To which resolution are you speaking?

Mr. HYATT: That the Government prepare a uniform set of books for agricultural societies. I presume that means for entries as well as for everything else. I think that part of it should be left to the societies or the secretary to deal with just as he sees fit. A book prepared something similar to the cash book of the township municipalities might be all right for the treasurer. In a great many cases the secretary and treasurer is one and the same man. You will all agree with me, that we should try to learn everything in the quickest and simplest way possible; because the remuneration we get is so small that we cannot afford to spend very much time on it. My book is very simple, and I think any man can follow it. I simply take an old book I have used for years, a journal, and I take the form that is sent us by the Government for reports and in that form there is a column for the amount paid for live stock, the amount paid for rent and fitting up buildings and grounds, and I give a heading for that. Another page I use for expenditure of interest and insurance, and whatever I pay out I simply charge that money up under the heading to which it belongs. I use the same heading in my book that I have to use in the annual report and when I want to make up my annual report, all I have to do is to hunt out my vouchers, add up the amount I have paid out, and set it down on my report.



B.—Horse sheds of the Barrie Society. Cost not known. These are an improvement on sheds like those shown in illustration A, as the horses can be taken out of each stall without having to be led past each other.

A Member: It seems to me that in dealing with this question, that the directors should see that the annual report is made out in proper time and sent to the authorities, and if that was done there would be no query from the Government about delinquent secretaries. It seems to me that the responsibility rests directly upon the directors, that the document should be made out and be sent at the time of the annual meeting. The Government gives thirty days to do it in, but it should be done at once, and if that was done there would be no opportunity for the secretary to mix figures. I would not interfere with one item on my cash book for any member of my board.

Mr. Knowles: The resolution only refers to the cash book.

Mr. Sproule: The last gentleman spoke of having a certain page for a certain department. Don't you think it would simplify the thing much better to rule off a column for each department at the right hand side of your cash book and then make your entries one after the other and at the end of the year you would have them all together. It seems to me that that would simplify the matter very much.

The **Chairman**: I will read the resolution:

"That the Department of Agriculture be requested by this Association to have published a set of account books for the use of agriculture societies in this Province, and that the Department enforce their use by all societies drawing a Government grant." The motion was put to the meeting and lost.

Mr. **Stock**: If we have a municipal auditor we should have a set of books or the auditor cannot audit.

Mr. **Gough**: We appoint the best auditor we can get, and we always find our books come out to a cent, and the report is submitted to the annual meeting, and they are again audited. (Applause.)

The resolution was amended as follows, and put to the meeting: "That we, the delegates present at this Fairs Association, think it would be advisable for the Government to appoint a Provincial auditor of fair books in the Province." Lost.

Moved by James D. Smith, seconded by George Yearby: "That in the opinion of this meeting that all agricultural societies shall pay a capitation tax of one dollar yearly to the Fairs and Exhibitions Association for the purpose of meeting the necessary expenses of said Association. The same to be paid whether the societies send delegates or not.

A **Member**: Is that an extra dollar or the dollar the delegate pays now?

The **Chairman**: How are we going to collect this capitation tax?

Mr. **Wallace**: There are four hundred societies. Why would you require so much money?

A **Member**: There has been no difficulty in collecting the fee.

A **Member**: I think this should be left to the judgment of each individual society, and not make it compulsory. Motion lost.

AUDITORS' REPORT.

We hereby certify that we have examined the treasurer's books and find the receipts from members to be $122. Interest on bank account 70 cents. Total $122.70. Disbursements, balance from last year due treasurer, $2.87. Accounts paid $109.62. Balance on hand $10.21.

W. Hughes Charles,
J. E. Hudspeth,
Auditors.

Moved by Mr. Pearson, seconded by Mr. Davidson: "That the auditors' report as read be adopted." Carried.

GENERAL BUSINESS.

Col. **Sanders**: You have decided by resolution that you would memorialize the Government that horse racing should be permitted at fairs. Now I take it that that is not the most important feature that the new agriculture and arts act may happen to cover. Many of us are here and we expect to carry something home with regard to the new Act, but I am also aware that we cannot get that information, but as you have memorialized the Government regarding one important feature I think there is another important feature that we should pass a resolution on, and that is the division of the Government grant among these societies. I am told that some statement was made with reference to it last evening by Mr. Cowan. We all recognize that the Act would not be changed in that direction unless the division of the Government grant had been manifestly unfair. I think you agree with me that the division of the money has been heretofore unfair for the reason that it was decided upon many, many years ago, I believe fifty or sixty years ago, and there have been but very slight alterations since that time, although conditions have changed very much. I think it is important for us to know whether the struggling township shows are going to be guaranteed that share of the grant that they are entitled to. Therefore I move that accompanying the memorial regarding horse racing a memorial should be presented to the Minister of Agriculture asking him to consider the question of the Government grant and to see that the division is made upon a more equitable basis.

A MEMBER: I have much pleasure in seconding that resolution. We have often lost sight of the actual amount expended in connection with that Department, and we should get back to the first principle that the Government grant should be in proportion to the advantages that are offered. I have much pleasure in seconding Col. Sander's resolution, because I believe we are now in a position to get fair play.

Horse stable of the County of Russell Agricultural Society. It contains five large box stalls and 16 single stalls and cost about $500.

The CHAIRMAN: The principles named in the resolution were passed by this Association last year, practically unanimously, and it seems to me like child's play to introduce the resolution again this time when the Government are proceeding upon the basis of the resolution we passed last year. The new Act is being based upon that resolution and the conclusions that were arrived at by this Association last year, and I think it is entirely unnecessary to introduce that resolution again this year.

Moved by D. Hughes Charles, seconded by James Mitchell: "That the best thanks of this convention be conveyed to the mayor and corporation of the City of Toronto for the use of the rooms of the city hall, and that the sum of five dollars be paid the janitor of this hall for the trouble he has in connection with the convention." Carried.

The CHAIRMAN: We will proceed to discuss the duties of officers of agricultural societies.

Mr. Price: In order that Col. Sanders and other gentlemen here may not be aggrieved over this matter, and in order to settle all disputes and make them feel happy with regard to this resolution, Mr. James, the Deputy Minister of Agriculture, is here in the hall, and I think he can in a few words make matters plain.

Mr. C. C. James, Deputy Minister of Agriculture: While I am not in a position to disclose anything that may be of a confidential nature, I may simply say that we are, as far as possible, following out the wishes of this convention and I think you will be fairly well satisfied when the proper time comes for disclosing the conditions of the Act. You will through the public press receive the details sufficiently full to indicate to you the exact lines along which the Government intend to move, but I will say in general terms that the wishes of this Association are being followed as closely as it is possible to follow them. (Applause.)

A partial view of the buildings on the South Renfrew Fair Grounds. The buildings here shown were erected in 1903-4 and 5. The large building in the right foreground is a horse shed 32x90 ft. It cost some $600. In the background, the building with diamond-shaped windows, is a cattle shed. It is 30x60 feet, with a 5 ft. passage down the middle for spectators, and 10 low stalls on each side, each 6 ft. wide. The building is of rough boards, battened and whitewashed. It cost a little less than $450. The next two buildings to the left are the swine and sheep pens, duplicates, 22x60 ft. with a 6 ft. passage for spectators. The pens are 6x8 ft. planed lumber, XXX shingle roof; two coats paint. The swine pens have a heavy plank floor. Cost, sheep pen, $329; swine pens, $378. In the left foreground are two new horse sheds, duplicates, 32x63 ft., planed lumber; 8 ft. walls; corrugated iron roof, stalls 9x13 ft., with partitions 8 ft. high between them; a 6 ft. passage with 3 ft. barrier of lumber and heavy wire netting nailed above that. The doors are cut into upper and lower sections. Each stall is fitted with harness hooks. Two coats of paint. These cost about $500 each. All these buildings are fitted with electric lights at a total cost of less than $50. The water trough, fed from the town waterworks, stands between the sheds. Buildings of this kind are excellent as they afford protection to the spectators as well as to the stock.

Q.—Is a small city a suitable place to hold a fair? A.—Yes.

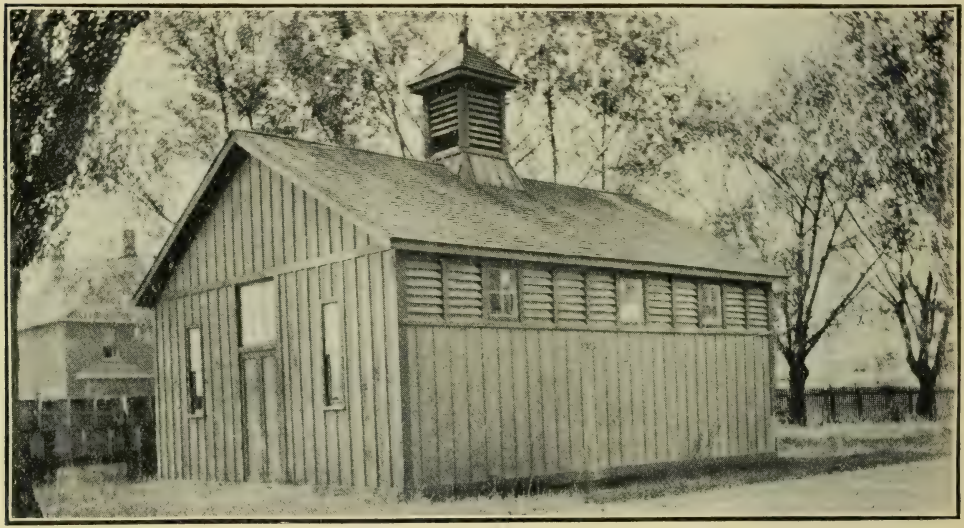
Q.—Should side shows at exhibitions be permitted? A.—No.

J. M. McCallum: During the past two years I have been permitted to have considerable experience in travelling around the different parts of the Province, in the capacity of an expert judge, and I have occasion to meet some of those objectionable features such as immoral or lewd side shows. The Act as I understand it forbids them. Still they are held year after year, and those of us who have wives and sisters who visit these local county exhibitions have put up before us these immoral exhibitions year after year and I think it should not be allowed, and I have a resolution which I wish to move. Moved by J. M. McCallum, South Easthope and East Zorra Society, seconded by Henry Kelly, Wellesley: "That this convention, realizing the importance of our exhibitions being kept as free from objectionable features as possible, would respectfully petition the Minister of Agriculture to take such steps as he may deem wise to prevent the introduction at agricultural exhibitions of side shows of an immoral or debasing nature."

The Chairman: You have heard the resolution, are you ready for the question?

A Member: The Minister of Agriculture is quite competent to frame a law to prohibit things of that kind.

Another Member: I am quite free to confess that I am in perfect sympathy with everything that would destroy shows of an immoral character and to prevent them from exhibiting upon any agricultural show ground in this Province, but I wish to say that it seems to me that it is a matter for the criminal law of this country. A great deal depends upon the directors of the societies, if they allow these things. All they have to do is to put an officer upon the grounds and show them out and away they go and it seems to me we have the machinery to prevent anything of that kind from appearing at agricultural shows, and why should we ask the Minister to give us a law which we already have in our hands.



Poultry shed of the Collingwood Society. Cost price not known.

A Member: I think that resolution that was moved this morning concerning horse racing and attractions at fairs covers the ground.

The Chairman: The gentleman is quite within the rules of the order paper in bringing the resolution forward. The order paper says "Should side shows at exhibitions be permitted?" and I think the resolution is in order.

The motion was carried unanimously.

Col. Sanders: We have lost nearly half of the afternoon by the election of officers, and I think there is a weakness in our constitution. This body is getting very large and practically unwieldy, and I think if you would allow a resolution to be submitted to amend the constitution so as to have a nominating committee appointed, and to let that nominating committee bring in their report, we would save more than half the afternoon, and I therefore move that the constitution be amended in that direction, and that a nominating committee be appointed at each convention to report.

Mr. Walter Sapp, Uxbridge: In seconding that motion I feel that it is a necessity, and I hope this convention will feel the same way. As the mover has pointed out the afternoon has been lost by the present method of electing officers, and a great number have not had a privilege of voting.

The Chairman: The resolution is a notice of motion for our next annual meeting to be considered in the early part of the meeting and carried out at that time.

A Member: There will have to be a new provision made by the Government for the organization of new societies, and I hope it will not be overlooked.

Dr. McGuire: In regard to the election of officers, I was just thinking over a plan that is used in our dental societies. We divided the association into subdistricts, and prior to the annual meeting, blank ballots are sent out, and each dentist in the district has a vote for so many men to be elected from that district and I think that if we divide this Association into subdistricts and each society is sent a blank ballot and they are allowed to elect two men from each subdistrict on the board of directors, they could send in their ballots filled out, accompanied with the membership fee, and any ballot that was sent in unaccompanied by the dollar would not be recognized, or the delegate could bring the ballots and the membership fee so that we could do away with all the time we have lost this afternoon in electing a board of directors. We could also send out ballots for the other officers, president, vice-president and so forth and they might be chosen from any district and they would have a chance to vote for the presiding officer. I think that that would simplify that matter a great deal and there would be no pulling and hauling between the east and west or the north and the south. Each district would have two representatives.

A Member: I do not think that that would be practical. People from a distance do not know each other, and by coming here they see one another and know who to elect. That proposition of having a nominating committee was tried in this Association once before and found to be unsatisfactory, and they changed back to the election of officers by the people assembled.

Mr. Lee: I think that if I am a delegate to this convention I will pass no resolution that is brought down to elect officers by any set number of men. I believe the people should elect their own officers. If you elect them by a committee you will run it into cliques.

As a great many of the members were very anxious to get away on the afternoon train, and the railway agent having appeared to validate the tickets, the meeting was brought to an abrupt close.

THE LAWS GOVERNING THE AGRICULTURAL SOCIETIES IN THE NEW ENGLAND AND CENTRAL MIDDLE STATES OF THE UNION.

As a result of the trip taken through the New England States, and the States of New York, Pennsylvania and Ohio during February, 1906, I found that the laws in force in these States governing the work of agricultural societies differ widely.

All of the States which grant aid to their societies have laws prohibiting the sale of liquor or the conducting of games of chance and other features of that nature on the exhibition grounds at the time of the exhibition of any agricultural society. Pool selling, also, is prohibited in each of the States, although in Connecticut and Ohio, where the horse racing element has considerable power, the State legislatures have been petitioned to legalize pool selling at agricultural exhibitions. These petitions in each case have been refused. In none of the States is there any regulation to control horse racing at the exhibitions of the societies. In some of the States the societies are allowed to include the moneys expended for horse racing as though they had been expended in the same manner as the other premiums usually awarded at agricultural exhibitions and their Government grants are awarded on this basis.

In three of the States, Vermont, New Hampshire, and Pennsylvania no State aid is given to the societies. There are a number of agricultural societies mostly managed by private individuals through joint stock companies, for their own private benefit. Some of these societies have done valuable work for the improvement of agricultural conditions in their sections.

Horse shed of the Collingwood Society. Cost not known. Note what an improvement the trees are.

In Vermont there were fourteen of these societies, in New Hampshire twenty-five and in Pennsylvania fifty. Many of these societies are devoted largely to horse racing, while some give considerable prominence to special attractions. Others are conducted largely on agricultural lines and are doing excellent work.

In the New England States the societies in Maine probably are doing the best work. Various reasons may be assigned for this. Maine is still essentially an agricultural State. The laws in force in Maine governing the societies are the best in force in any of the New England States. One of the strongest features of this Act is that the Government grant is distributed among the societies in proportion to the amount of money the societies expend for agricultural purposes. A clause in the Act relating to this, and also the amount of the grant reads as follows: "There shall be appropriated only from the State treasury a sum of money not exceeding one cent and a quarter to each inhabitant of the State, which shall be divided among the legally incorporated agricultural societies of the State not provided for by special enactment according to the amount of premiums and gratuities, actually paid in full by said society, provided, that the stipend shall be based entirely upon the premiums and gratuities actually paid in full on exhibition stock and products, and provided that no society shall receive from the State a sum greater than that actually raised and paid by the society for said purposes; provided also, that each of the said societies shall cause the prohibitory liquor law to be enforced on all grounds over which they have control, and not allow gambling in any form or games of chance on said grounds."

The population of Maine is such that the annual grant in 1905 amounted to $16,180, of which only $8,680.82 was distributed among the smaller fairs in the State, the remainder being given to the State Pomological Society and three large exhibitions, the Maine State, Central Maine, and Eastern Maine exhibitions. There are forty-four local and county societies in the State, the average grant being about $200.

A row of 40 open front cattle stalls on the grounds of the Richmond Society. Size of each stall 8x10 ft. The society has another building that contains 40 more cattle stalls. The two are valued at $1,000.

A clause in the Maine laws not found in those of any of the other States visited reads as follows: "No State stipend shall be paid to any agricultural society offering or paying premiums on grade males; the commissioner of agriculture may make this a part of the sworn return to be made by the proper officers of all agricultural societies; provided that evidence as to the eligibility to registration be accepted as satisfactory proof of purity of blood."

Still another clause of interest relates to the use of score cards at the State exhibitions and reads as follows: "The payment of the State stipend of the Eastern Maine State Fair and Maine Agricultural Society shall be conditional upon the use of the score card system in the judging of all horses, breeds of cattle, sheep and swine, and of dairy products; the cards to be used for pure broods to be adopted by the several breeders' associations. A copy of each score card as filled by the judge shall be delivered to the exhibitor of each individual animal judged. All county societies receiving a three hundred dollar stipend or more, shall be required to faithfully observe the same system and conditions."

Another clause in the Act that is of interest reads as follows: "Every society receiving the bounty of the State shall expend an equal amount each year in premiums and gratuities for the improvement and encouragement of agriculture, horticulture or the mechanic arts, unless the commissioner of agriculture directs for what purpose a sum not exceeding half of such bounty shall be expended; and then it shall be expended accordingly.

"Every society applying for the bounty of the State shall require of all competitiors for premiums either on animals, crops, dairy products, or improvements of soils or manures, a full and accurate statement of the process or method of rearing, managing, producing and accomplishing the same, together with its cost and value, with a view of showing the profits or benefits derived or expected therefrom; and the application for bounty shall embrace all the specifications included in the following form to it."

A neat set of buildings, on the grounds of the Brockville Society, used for the exhibits of horses and cattle.

In regard to the latter clause I was informed that it has been difficult to enforce it and that no attempt is made to require exhibitors to furnish such statements as mentioned in the clause.

The Massachusetts Law.

The law in Massachusetts is a very old one, having been first enacted about the year 1818 and revised many times since. Few changes have been made in it since 1882. In this State the societies have been decreasing in importance for many years, owing, largely, to the great increase in urban population. There is a general impression that the Act is a poor one, and that it needs a thorough revision. In brief the principal clause of the Act provides that every incorporated agricultural society that has raised by contribution of individuals and put out at interest on public or private security, or invested in real estate, buildings and appurtenances for its use and accommodation, one thousand dollars, as a capital appropriated for its uses, shall, except when otherwise determined by the State board of agriculture, be entitled to receive in the month of October annually $200, and in that proportion for any greater sum so contributed and put at interest or invested; but no society shall receive a larger sum in one year than it has awarded and paid in premiums during the year last preceding nor more than $600."

There are two serious defects in this law. One is that while it stipulates that every society shall have certain assets it does not pay any attention to the liabilities of the societies, which in the case of some of the societies in the State greatly exceed the assets. The second defect is that the grant is not based in proportion to the amount expended by the societies for agricultural purposes. The result is that a society expending $6,000 for agricultural purposes receives no larger grant than a society expending $600 or even less. Many of the societies in this State are largely horse trots. The dates for their exhibitions are arranged so that it will be possible for the fastest horses in the country to compete for purses, and pool selling is common at many exhibitions, although the State police have been trying to suppress this.

The manner in which the societies in this State have been decreasing in importance is shown by the returns made to the State board of agriculture. In 1891 there were 37 societies in the State drawing a State grant of $20,802, the membership of all the societies being 31,747. In 1905 the number of societies had decreased to 29 and the State grant to $17,400 and the membership to 26,308.

Connecticut.

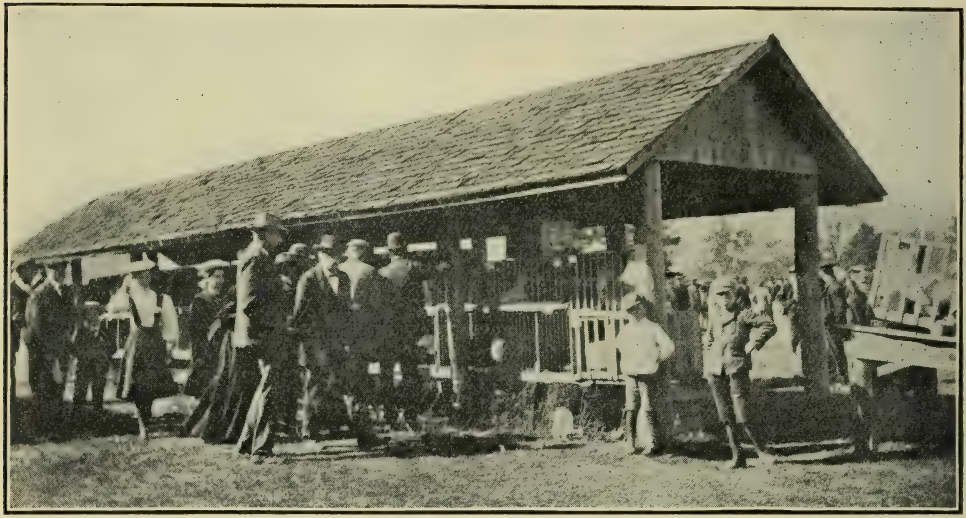
Although the law under which the societies in Connecticut operate is better than that in force in Massachusetts, the societies in this State are not doing much better work. As in Massachusetts, the great increase in the urban population is one of the reasons for the lack of interest shown in the societies of the State as a whole.

The principal clauses in the Connecticut Act reads as follows:

"There shall be annually paid to the incorporated agricultural societies of this State the sum of $4,500 to be distributed among said societies as follows: Each society which shall in any year raise the sum of $100, and shall pay that amount in premiums for horse racing, trials of speed, or any recreation or amusement, shall receive $100 from said appropriation. The balance of said appropriation shall be divided among all said societies in proportion to the amount of premiums and gratuities exceeding $100, actually paid in cash to exhibitors at their respective annual fairs, holden within twelve months previous to such distribution, not including purses or premiums for horse racing, trials of speed, or any recreation or amusement: provided, however, that no portion of said sum of $4,500 shall be paid to any society which during the four years preceding has declared or paid any dividends to its stockholders or members."

As in Massachusetts and Maine, the horse racing element has a very strong hold in connection with the annual exhibitions of the societies. The returns made by societies for 1904 show that the 29 agricultural societies in the State expended $20,599 for all agricultural purposes combined, $19,876 for horse racing and $10,376 for special attractions, or $9,652 more for horse racing and special attractions than for all agricultural purposes combined. During 1904, 29 societies held exhibitions, their average grant being about $150. Immoral features have become so common at some of these exhibitions that an earnest attempt has been made to stamp out these features from the exhibitions, but not with very great success. A bill having this object was passed recently and is quoted in full in my annual report. Another clause in the Act governing the societies requires the president and the secretary and treasurer of each society to make oath, in their annual statement each year to the secretary of the State Board of Agriculture, that the provisions of the law pertaining to the operating of games of chance, to the performance of immoral side shows, or the sale of spirituous liquors have not been violated.

Some of the societies that attempted to rid their exhibitions of these undesirable features have found it necessary to engage minstrel shows of an unobjectionable nature, at their own expense, to amuse the crowd, and in part take the place of the midway. An agitation has been in progress of late years to have the State police attend the fairs to suppress objectionable practices, as it has been found at many exhibitions that the local police are of but little value.



A shed used by the Otterville Society to protect its poultry exhibits. Size 50x6 ft.; cost $100.

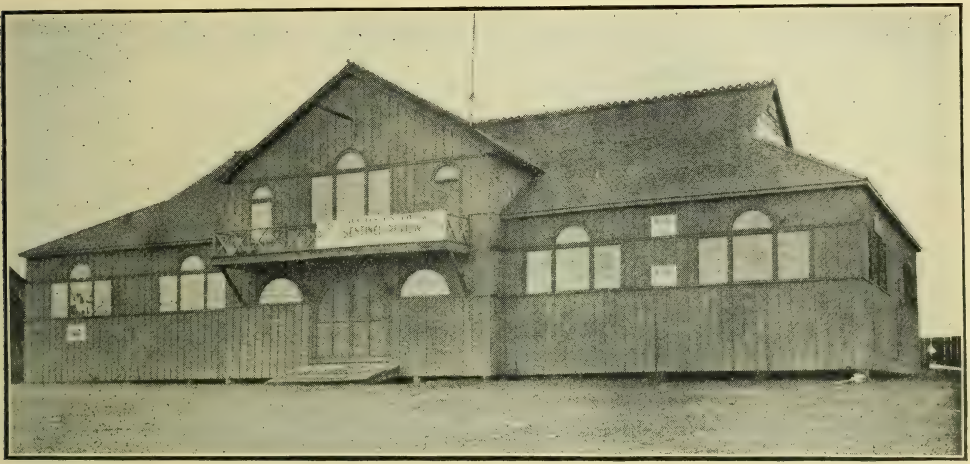
Several prominent gentlemen connected with agricultural societies informed me that only about half the societies in the State made agriculture their main object, and even at that few if any are purely agricultural. Some of these gentlemen believed, however, that on the whole the societies are doing more good than harm, although they admitted that it is a debatable point.

NEW YORK.

In many respects the conditions in New York State are more than in any other State like those that have prevailed in Ontario. This is because it is the only State that has made any distinction between district and township societies and by giving larger grants to the former than to the latter.

In 1841 a bill was passed by which a grant was made to county societies. In this bill, fixed sums were given to the organized county societies. Later this was amended several times until it was finally made possible for township societies, in counties where there were no county societies, to share in the grant. In 1895 the law was further amended so that township societies were given 25 per cent. of the total grant and the remainder, or 75 per cent., to the county societies. Between 1896 and 1901 the bill was again amended so that the share apportioned to the township societies was increased to 30 per cent.

Dissatisfaction was still felt with this method of apportionment. It was found that some of the smaller societies were getting larger grants than they paid out in premiums for agricultural purposes. Finally, in 1901 all the societies in the State were placed on the same basis, and it was arranged that the grants should be distributed among the societies in proportion to the amounts they paid out for agricultural purposes. No society is allowed to draw an amount in excess of the premiums it has paid out for agricultural purposes, nor a larger total grant than $4,000. The distribution among the societies is made in proportion to the total amount they expend for agricultural premiums.

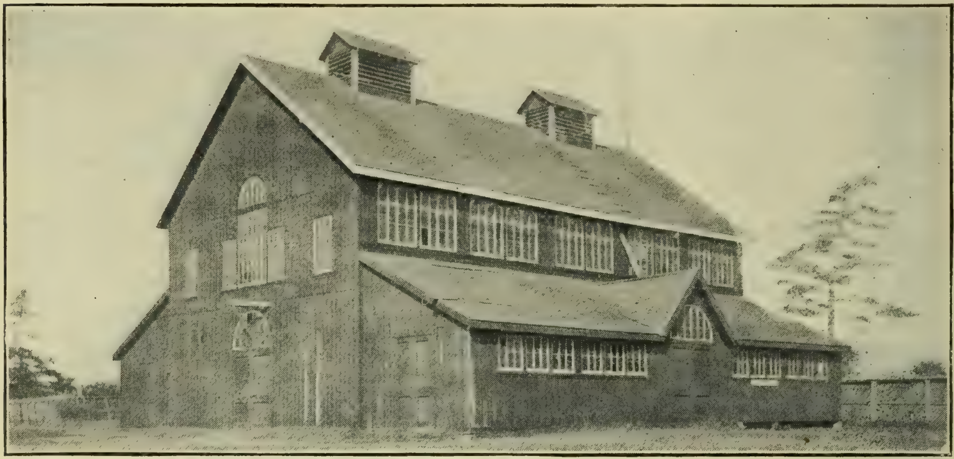


Main building of the Woodstock Society. Size 50x100 ft., erected in 1891 at a cost of $1,600. Were the society to build one now it would erect two smaller ones instead of one large one.

In part, the law, as finally passed, reads as follows: "All of the monies already appropriated or hereafter appropriated for the promotion of agriculture in any one year, shall constitute a fund which shall be disbursed on behalf of the State, and shall be apportioned and distributed as hereafter described among the various county societies, the American Institute of the City of New York, and among the other various township or other agricultural exhibitions or agricultural clubs which have received monies from the State. Such apportionment and distribution shall be made in the following manner. There shall be apportioned and distributed to such societies in proportion to the actual premiums paid during the previous year, exclusive of the premiums paid for trials and tests of speed, skill and endurance of man or beast. Any such society which shall fail or neglect to hold annual fairs and file their annual reports as provided by this Act, for two consecutive years, shall forfeit all their charteerd rights, including the privileges or moneys they may hereafter otherwise be entitled to under the provisions of this Act."

The clause relating to undesirable features reads as follows: "Any society which shall knowingly permit any immoral, lewd, obscene or indecent show or exhibition, use or knowingly permit the use of any mechanical device, instrument, contrivance, in the operation of which bets are made or wagers laid, wheel of fortune, or the planning or carrying on of any game of chance, upon the grounds, shall by it forfeit its rights to any moneys it might be entitled to receive under the provisions of this Act." The president and secretary or treasurer of each society are required to file a certificate with the Department that these features were not permitted at their fair. The Department of Agriculture reports that since the change in the Act by which the giving of fixed grants to societies was discontinued, and since they have received their grants in proportion to their expenditures for agricultural purposes, there has been a great improvement in the work of the societies, and that the expenditures for agricultural purposes have shown a marked increase.

The funds that are distributed among the societies are obtained in a rather unusual manner. They are secured by means of a special Act which imposes a tax of 5 per cent. upon the gross amount of receipts of all racing associations, incorporated under the laws of the State, whether for the improvement of the thoroughbred or the trotting horse.



Main Hall of the Peterboro' Society. Cost about $1,600. Note the numerous windows and ventilators.

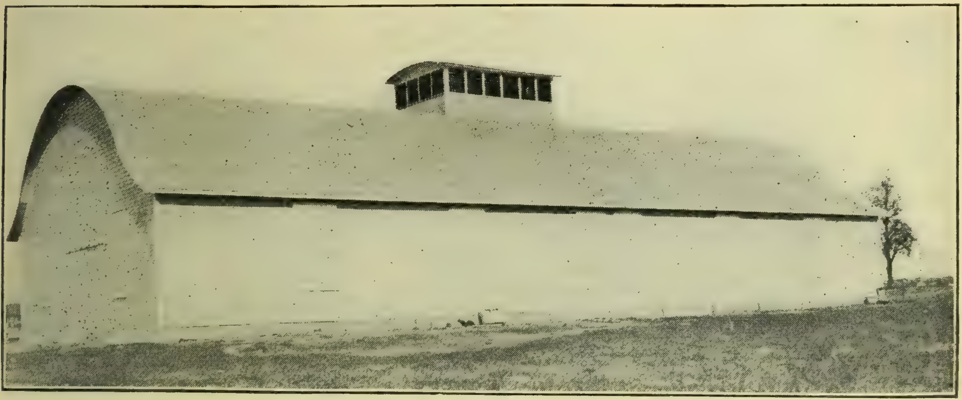
In 1904 the money raised in this way was so large that the Department was able to pay all the societies practically an equal amount to what they had paid out in premiums for agricultural purposes, including such societies as were entitled to the maximum grant of $4,000. That year the societies in the State practically received $1 from the Department for every dollar they expended for agriculture. In addition $57,000 of a surplus was left.

In 1902 the funds available were $164,000; in 1903, $184,000; and in 1904, $231,000. There are some 61 counties in the State and 93 societies. In 1904 the amount paid in premiums was $296,000 and in 1905 $308,000. Although the societies are much larger than the average society in Ontario there is a general impression in the State that there are too many societies. It is generally admitted that societies in the State are a great benefit to the agricultural interests.

OHIO.

In Ohio the agricultural interests of the State are looked after by the State Board of Agriculture. Each year each county agricultural society in the State elects a representative to attend the annual meeting of the board of agriculture. At this meeting the delegates elect two members of the State board, whose term of office is five years and until their successors are elected. The State board consists of ten members who employ a secretary and other assistants who give their whole time to the work of the board. In this way the agricultural societies of the State play an important part in the management of all work undertaken by the State for the improvement of agricultural conditions.

While there are a large number of societies in the State, the only ones entitled to a grant are the county societies. There is a county society in every county. In cases where the site for holding the county fair is situated so far from the geographical centre of the county that in the opinion of the commissioners of the county it is in the interests of agriculture to establish another, an additional society is formed.



A well lighted, well ventilated main hall built in 1905 by the Russell County Agricultural Society. Size 50x100 ft.; cost $2,500. Notice the strong shutters on the windows.

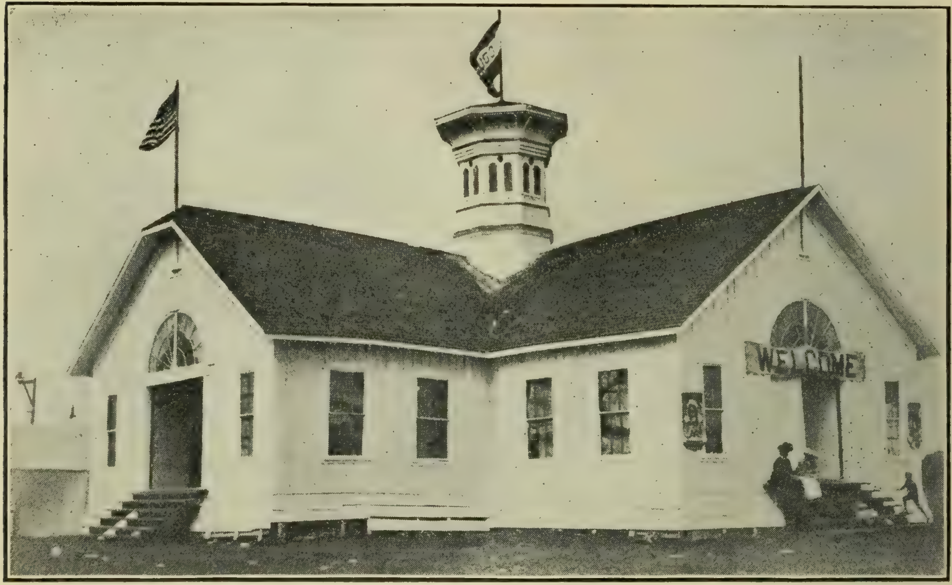
The grants to the societies are raised in a rather peculiar manner. Each year the society makes a report to the State Board of Agriculture, and upon this report being adopted the county auditor is required to draw an order on the treasurer of the county in favor of the society for a sum equal to two cents for each inhabitant of the county, upon the basis of the last previous national census. It is stipulated that the total amount of the grant in any county shall not exceed the sum of $800. It will be noticed that by this method no account is taken of the value of the work being done by the different societies.

Each society is required to publish annually a list of the awards and an abstract of the treasurer's account in a newspaper in the district, and to make an annual report to the State Board of Agriculture.

In the rules for the management of the societies it is stipulated that the board of directors for each society shall consist of not less than ten members and not more than one member from a township, except in a township in which a fair is held, where two members may be elected. In townships having a city or town of a population exceeding 7,000, an additional member may be elected. The tenure of office of the directors has to be so arranged that the terms of from one-fifth to one-half of the members shall expire annually, and the terms of office shall be not less than two or more than five years. A portion of the officers are elected annually.

Last year there were 69 county societies. In addition to the county societies there is the State fair, which receives no regular annual grant from the State. This fair has from time to time received large special grants for the equipment of the grounds and buildings. In twenty years it has received about $330,000 from the State.

Owing to the fact that the laws relating to the societies receiving State aid prevent the operation of games of chance and the sale of liquor on the exhibition grounds, some societies have cut away from the State that they may escape the provisions of the State regulations. Many societies permit the sale of beer on their grounds and receive money from the sale of the privileges. The secretary of the State Board of Agriculture informed me that he believed the societies in the State, as a whole, were doing excellent work for the improvement of agriculture, but confessed that they have some "pretty hot fairs."



Main Hall of the Morrisburg Society. Cost $800.00. Note how the painting has improved it and that the doors are large enough to let the crowd in and out without congestion.

There is no provision to restrict horse racing at the exhibitions, and the result has been that practically all the societies in the State conduct horse races on a more or less extensive scale. Several attempts have been made to have pool selling legalized.

Last year the 69 societies expended $212,642.19 in premiums, of this amount $107,627.61 was spent for horse racing. This leaves a balance of $105,014.58 that was expended for all agricultural purposes combined, including all classes of live stock, machinery, manufactures, farm products, fruit, flowers, household products, fine arts and merchandise. In other words $2,613.03 more was spent for horse racing than for all agricultural purposes combined. These figures do not include money expended for special attractions. Many of the societies go in for special attractions on an extensive scale.

The returns made by the societies to the Department show that in 1904 they realized $60,765.94 from booth rents and privilege permits. This is equal to an average of slightly over $880 a society. This will give some idea of how extensively the midway features are connected with the exhibitions of the State. Most of the societies in the State receive the maximum grant of $800 a year. A few, in counties where the population is small, do not draw quite that grant. The farmers of the State take an interest that is more or less keen (depending on the locality) in their agricultural exhibitions.

THE ILLUSTRATION FAIRS AT BEACHBURG AND SIMCOE.

Once the agricultural societies of Ontario cease to receive fixed grants, irrespective of the work they are doing, and their grants are apportioned among them in proportion to the amount they expend each year for agricultural purposes, a great change will take place in the character of the exhibitions held in the Province. Many of the smaller societies, that have been receiving grants that have been out of all proportion to the value of the work they have been doing, will gradually die, while the grants to societies that have been doing specially good work, and which have not been receiving grants in proportion, will be increased. This will tend to a material reduction in the number of exhibitions held each year, and to the strengthening and encouraging of the best societies.

Main Hall of the Barrie Society. Size 175x72 ft., cost 10 years ago $3,500, but could not be built now for less than $5,000 to $6,000. It has given fair satisfaction.

It is admitted that our agricultural societies should be of much greater educational value than they are. Their aim should be to encourage the production of the most profitable varieties of live stock and farm products, and their prize lists should be arranged accordingly. Wherever possible demonstrations should be given at the exhibitions to show the public the type of animals and the kind of produce that the markets are demanding.

and the best methods of preparing these for market. To conduct this work successfully it is necessary that the Dominion and Ontario Departments of Agriculture the Agricultural Colleges, and the Experimental Stations should co-operate and work with the agricultural societies in every way possible.

With fewer but larger exhibitions, and these exhibitions receiving larger Government grants, the societies will be able to increase their prize lists, offer larger prizes improve their grounds and buildings and to introduce many educational features that hitherto have been impracticable.

Believing that the time is coming when it will be possible to arrange exhibitions in circuits, so that the various educational institutions of the Province and the Dominion Department of Agriculture will be able to co-operate more with the societies by preparing special educational exhibits and sending them around from one exhibition to another, the Ontario Department of Agriculture last fall arranged to hold two illustration fairs. The object of these fairs was to show how the various educational institutions and the societies can thus co-operate, and to show how the various departments of our exhibitions can be made of greater educational value.

The societies selected as the demonstration fairs were the North Renfrew society, the exhibition of which was held at Beachburg on October 5th and 6th, and the Norfolk Union Society, whose exhibition was held at Simcoe, October 17th, 18th and 19th. These are two of the best purely agricultural societies in the Province. Both have splendid grounds and buildings practically free from debt. The other agricultural societies in the Province were notified and invited to send delegates to these exhibitions. Meetings were held during the course of the exhibitions to afford the delegates an opportunity to discuss the various special features. The main features at each exhibition were identical, although there were some exhibits at each that were not at the other.

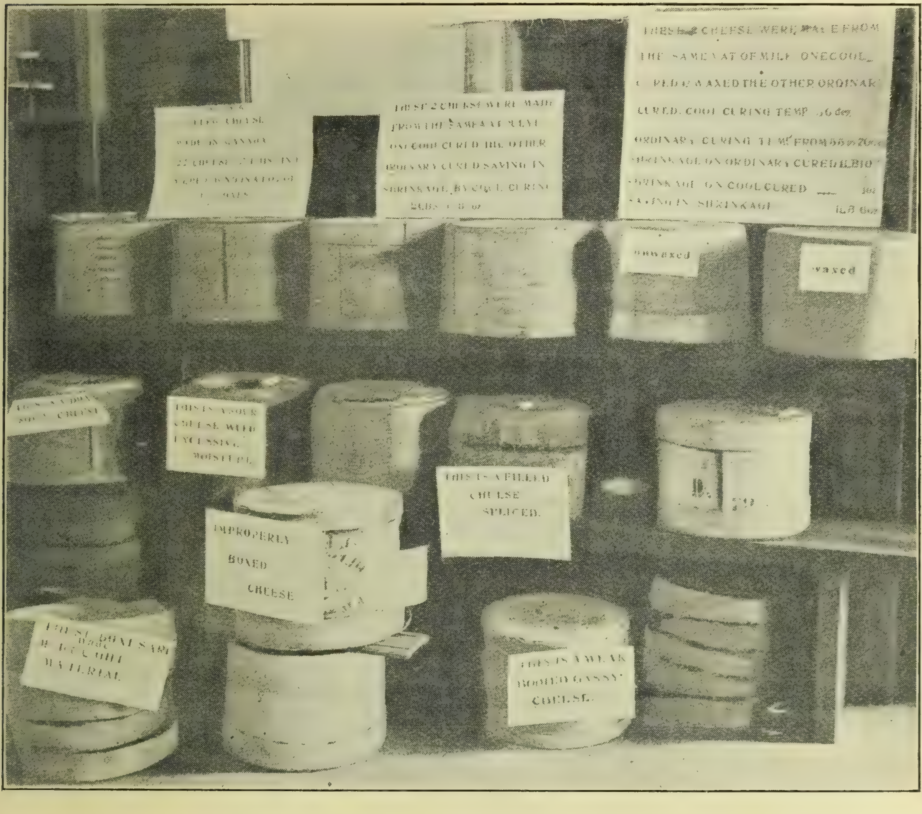
EDUCATIONAL EXHIBITS.

The following special features were introduced at each exhibition. Through the kindness of the Dominion Department of Agriculture, which co-operated with the Ontario Department of Agriculture in this work, special exhibits were made in the poultry, fruit, seed and dairy sections.

In the poultry department the Dominion Poultry Division made an exhibit of desirable and undesirable types of birds for fattening purposes, fattening crates, shaping frames, and boxes for the shipment of dressed poultry. There was a model poultry house and brooder, and an exhibit of a trap net, which showed how it is possible to ascertain which birds are the most valuable from an egg producing standpoint. In this connection there was a special exhibit of two hens, one of which had laid over 200 eggs in the course of a year while the other had laid only six. Both hens were identically the same as regards size, plumage and color of their combs. There was, also a nexhibit of eggs showing how they should be graded according to size and color, so as to realize the highest market price. A plentiful supply of bulletins was on hand for the benefit of those sight-seers who might desire information in greater detail. The exhibit was in charge of Mr. F. C. Elford, Chief of the Poultry Division, who was present at all times to give information in regard to poultry.

A splendid exhibit of dairy products was in charge of Mr. N. G. Somerville, of the Government Cool Curing Room, Brockville. It consisted of cheese that had been properly cured and cheese that had been improperly cured. This exhibit showed the increased value of properly cured cheese.

There were exhibits also exemplifying the chief defects in cheese, including acidity and open and sour cheese, an exhibit of boxes showing properly and improperly packed cheese, including broken packages that had been injured owing to the flimsy material of which they had been constructed. Two packages of filled cheese attracted a great deal of attention. Charts on the walls showed the difference in value of properly and improperly cured cheese and gave other information of interest. This exhibit was the centre at all times for the dairymen.


unwaxed
waxed
Improperly boxed cheese
This is a filled cheese spliced.
This is a weak bodied gassy cheese.

One of the best educational exhibits at the Beachburg Illustration Fair, arranged at the request of the Ontario Department of Agriculture, by the Dominion Dairy Division, to show common defects in cheese, and the benefits in cool curing. Note that every exhibit bears an explanatory card. The same exhibit was made at the Simcoe Fair.

THE FRUIT EXHIBIT.

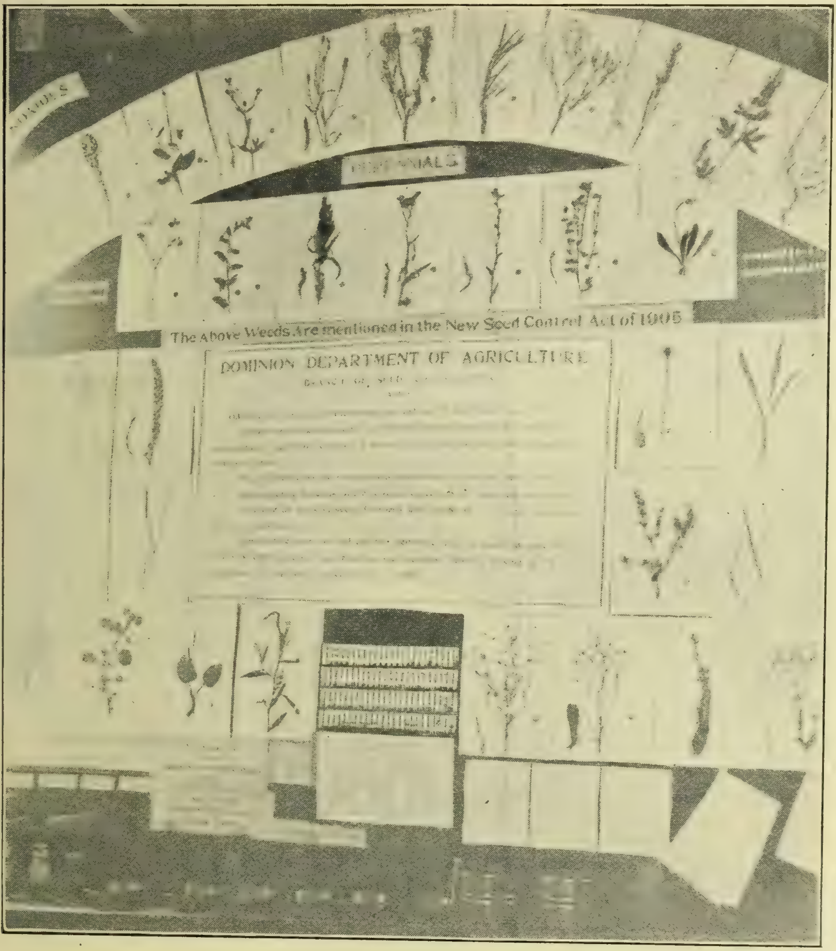
The fruit exhibit at Beachburg was looked after by Mr. A. McNeill, Chief of the Dominion Fruit Department, and at Simcoe by Mr. A. Gifford. It included apples from trees that had been sprayed, and apples from trees in the same orchard that had not been sprayed. This showed the great value of spraying. There were also samples from trees that had been pruned and from trees that had not been pruned, to show the increased size and better color of fruit obtained by proper pruning. A collection of desirable and another of undesirable varieties of apples for the neighborhood, each apple in which was labelled, attracted much attention.

The commercial aspect of the industry was represented by exhibits of properly and improperly packed fruit showing fruit that was number 1 and number 2 and number 3 in quality and improperly marked fruit, including a fraudulently packed barrel, having the best apples on the top and bottom and inferior fruit in the interior. Violation of the Friut Marks Act was illustrated by means of packages of fruit. People interested in fruit growing were able to obtain much valuable information through the exhibits.

Educational Fruit Exhibit, arranged at the Beachburg Demonstration Fair, by the Dominion Fruit Division, at the request of the Ontario Department of Agriculture, showing the proper method of packing fruit for shipping, infractions of the Fruit Marks Act, etc.

SEED EXHIBIT.

A special exhibit prepared by the Dominion Seed Division, and in charge of Mr. T. G. Raynor, was of great educational value. Samples of the most common weed seeds in bottles, and of weeds pressed were shown with brief statements showing how these weeds could best be eradicated. The new Seed Control Act and its various provisions was explained to all interested by Mr. Raynor, who illustrated his remarks by means of special features contained in the exhibit. The benefit derived by the selection of seed was shown by representative samples picked from plots where seed selection had been followed and from plots where no attention to selection had been given. There were samples of the various seeds in process of germination illustrating the difference between good and poor seeds. For instance of some corn 90 per cent. was germinating and of others only 28 per cent. and so on. Another exhibit showed clearly the value of clean and selected seeds.


The Above Weeds Are mentioned in the New Seed Control Act of 1905
DOMINION DEPARTMENT OF AGRICULTURE

The educational exhibit, made by the Dominion Seed Division at the Beachburg and Simcoe Demonstration Fairs, at the request of the Ontario Department of Agriculture, illustrating the different weeds found in Ontario, their remedies, etc.

AGRICULTURAL COLLEGE EXHIBIT.

The Ontario Agricultural College was represented by a splendid exhibit showing injurious and beneficial insects, pests that affect grain and other farm crops and methods of combating them. An aquarium attracted a great deal of attention, particularly on the part of the younger people whose interest it aroused. The exhibit served to illustrate the importance of interesting the young in matters of nature study.

A feature of both exhibitions that was greatly appreciated was cooking demonstrations given under the auspices of the Ontario Women's Institute. These were conducted in a tent provided for the purpose.

A small exhibit that was of keen interest to many was a model of a system of farm sewage disposal. It showed how a septic tank could be arranged that would dispose of all the sewage from an ordinary farm house in a perfectly sanitary manner. The cost of equipping an ordinary farm house with one of these systems was placed at about $45.

An educational exhibit, made by the Ontario Agricultural College at Beachburg Illustration Fair, 1906.

THE BEACHBURG FAIR.

In addition to these features there were several special exhibits at the Beachburg fair. One of these served to show the importance of raising the correct type of hog as well as the loss that is sustained by farmers through the careless handling and feeding of hogs. This was done by means of three live hogs. One was an animal that was too large to make an ideal side of bacon, one was an ideal type, and a third was too thin. These hogs were shown in a pen and printed cards drew the attention of the people to the weak and strong points of the animals.

In the main hall were shown five sides of bacon, furnished by the Geo. Mathews Co., Ltd., of Hull, Que. One side was a perfect specimen. Another showed several long bruises that greatly depreciated its value; these had been caused by the animals being hit when alive, shortly before they were slaughtered. The pork packers state that the loss to farmers by blows given their hogs, either by the farmers themselves or the drivers, amounts to hundreds of thousands of dollars a year. This side served to bring out forcibly the importance of careful handling of the live animal. Other sides showed the injury caused by feeding animals until they are too fat, soft pork and other defects in bacon. Each side of bacon bore a printed card drawing the attention of the crowd to the different points it was desired to emphasize.

Believing that the people should be offered every inducement to watch the judging and take an interest in the live stock exhibits, the Department of Agriculture and the directors of the fair had a seat placed all around the horse ring. This feature of the exhibition was one of the best appreciated of all. The seat was crowded all afternoon, mostly by ladies and old gentlemen. On no other feature of the fair were the management more heartily congratulated by the public. The total cost of seating the ring was about $40. The seats were of a permanent nature and will last for years.

View of the judging ring at the Beachburg Illustration Exhibition, 1905. This ring is surrounded by a seat, made at a cost of about $40, which was greatly appreciated by the spectators, and which was used all afternoon.

The Simcoe Fair.

At the Simcoe fair special attention was given to exhibits by school children, and fancy drills, but owing to the heavy rain on both days of the fair these were not nearly so successful as they otherwise would have been, and as they always have been at this fair. The nature of these exhibits is fully described in the accompanying report of the fairs convention.

Another feature of interest was a gasoline engine at work sawing wood and pumping water, both at the same time. The idea of this exhibit was to illustrate means of economizing farm labor. The engine in use was capable of cutting ensilage and turning a hand separator as well, all at the same time. This exhibit was surrounded by a crowd all the time it was in operation. It was desired to show by the exhibit that the manufacturers of agricultural implements will be willing to make exhibits at the fall fairs, when the fairs are large enough to so arrange the exhibitions that the exhibits can be taken from one to another without inconvenience.

At both fairs cards were attached to all the leading exhibits to draw attention to their points of educational value. These cards were printed by means of stencils that can be purchased by any agricultural society at a cost not exceeding ten or twelve dollars. Some of the photographs taken at the Beachburg fair, that appear in this report, show some of these cards. Owing to the unsuitable weather photographs could not be secured at the Simcoe fair.

The illustrations here published will give an idea of the nature of the various exhibits. It is believed that if exhibits of this nature can be introduced in connection with the majority at least of the agricultural exhibitions of the Province the educational value of our agricultural societies will be vastly increased.

Cooking demonstrations at the Beachburg Illustration Fair, 1905.

BUILDINGS USED BY AGRICULTURAL SOCIETIES.

On no one subject, concerning the work of the agricultural societies, does the Department of Agriculture receive as many requests for information, as in regard to the erection of suitable buildings for exhibition purposes. During the past two years an earnest effort has been made to obtain information that would be of value to societies but with very poor success. There are so few societies in the Province that own good buildings (over 85 per cent. of the societies lack proper grounds and buildings) that it has been found a most difficult matter to obtain information on this subject.

Those societies that have good buildings, in most cases are so situated that a description of their buildings would be of little value to the rest of the societies. As a rule, the best grounds and buildings are owned by societies whose exhibitions are held in close proximity to cities, such as those at Renfrew, Brockville, Collingwood, Strathroy and Aylmer. The comparatively large scale on which such exhibitions are conducted necessitates the erection of larger and more extensive buildings than are required by agricultural societies of the average class that are located in smaller centres. A few of the smalles societies, however, have exceedingly good buildings.

Another obstacle that has been encountered during the search for this information has been caused by the fact that a large proportion of the buildings in use by societies were erected many years ago, and no record of their cost is obtainable. It has been found, also, that it would not be safe to publish figures showing the cost of buildings now in use, owing to the fact that the price of timber and other material, as well as labor, in different sections of the province varies greatly. A few societies, whose grounds are in towns or cities or in close proximity thereto have been able to erect very satisfactory main halls at slight expense by arranging to have the hall utilized as a skating rink during the winter. In this way they are able to obtain a revenue from the building at a season of the year when the buildings of most societies are not in use.

The old style of main hall, used to accommodate all the exhibits, other than live stock, is going out of style. Its main disadvantage is the confusion and noise that is incurred by placing so many exhibits under one roof. Another weakness is that it forces those persons who desire to see certain exhibits to crowd past numerous other exhibits, in which they are not interested, in order to reach the exhibits they desire to see. This may happen several times in the course of an afternoon and causes unnecessary confusion and annoyance.

View of a part of the grounds of the South Renfrew Society, showing the main hall, grand stand and old sheep and swine sheds. The main hall is built on the same plan as the diagram for a main building published on another page.

To take the place of a main hall a number of societies are erecting small buildings. In one may be shown such exhibits as roots, grains and vegetables, in another ladies' work and the art exhibits, in another carriages and machinery, etc. In this way a society that is unable to meet the expense of erecting a large building finds it possible to construct gradually the buildings it most needs.

In the erection of buildings for exhibition purposes it is desirable that they shall be as well lighted as possible, that the exhibits may be seen to advantage. This is a most important point. Some societies purchase wire screens and fasten them to the outside of the windows of their buildings to prevent their being broken by mischievous boys during the seasons of the year when the buildings are not in use. In other cases wooden shutters are used for the same purpose.

In the construction of a main hall, or, in fact, any exhibition building, plenty of room should be left for passage ways so that the crowd may walk through without becoming congested at any one point. It is never desirable to have only one stairway leading to the second floor, there should always be two stairways either opposite each other or so arranged that the crowd, when necessary may be kept entering on one side and leaving by the other. When the stairway is large it is not so necessary to see that the movements of the crowd are thus regulated.

Two stories in a main hall are not altogether satisfactory. It is tiresome to the crowd to have to go up and down stairs, and the noise of the people on the stairs or overhead is distracting to those below.

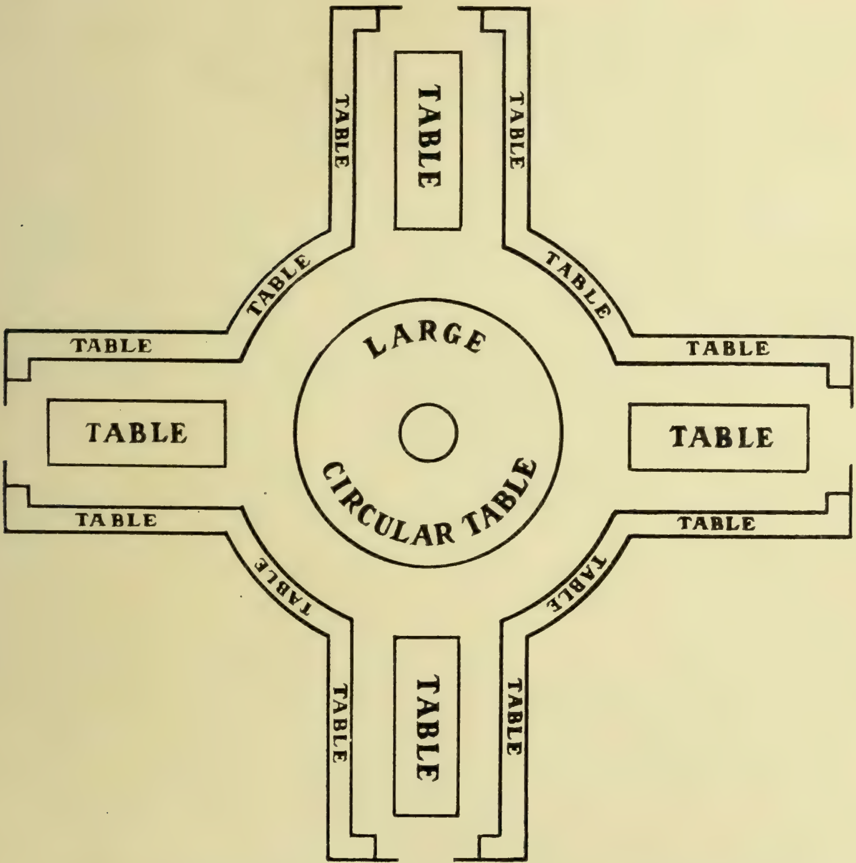
Where there is one floor above another it is well to use some deadening material under the floor, so that the noise of the feet of the people on the second floor may be muffled and thus prevent inconvenience to the people in the hall below. Every main hall should have at least two large doors so arranged that the crowd can pass in and out freely.

The grain and vegetable buildings and the poultry building of the South Grenville Society. These buildings are along the line of the use of separate buildings for exhibits rather than one large main hall. Size 30x50 ft. ; cost about $500 each.

The variety of the buildings erected for exhibits of live stock is so great, and the financial condition of societies is so different, it is impossible to recommend any set or sets of buildings that will be suitable for all. Every society should provide sufficient accommodation for the live stock exhibits to make it possible for all the exhibits to be unloaded and shown in pens. It is necessary, at present, for a large proportion of the societies to keep the stock in the waggons in which they are drawn to the grounds. This is very unsatisfactory to the exhibitors and to the sight-seers, as well as to the judges, and leads to much dissatisfaction.

The cheapest form of accommodation for hogs and sheep is to erect small wooden pens against the fence. Thus, material is required for only three sides of each pen. Later, additional protection for the animals may be obtained by adding a lean-to roof. A large proportion of the societies have erected not only their sheep and swine pens against their fences, but their horse and cattle sheds as well. In some cases poultry, sheep and even cattle and horses are shown under the grand stand. Wherever possible stalls or pens should have doors that will make it possible to lead out the animals without having to pass in the rear of the other animals on exhibition.

When erecting buildings for exhibits of live stock care should be taken to see that they are located in as central a position as possible. They should be on the highest ground so as to permit of ready drainage and to avoid mud in rainy weather. A large number of societies have made a great mistake by placing their live stock buildings at a remote portion of their grounds that the horse ring might have the best position in the centre of the grounds. This forces the spectators to walk the length of the grounds before they can see the live stock exhibits, and tends to discourage the inspection of the stock by sight-seers. Often people will not take the trouble, and leave with the impression that the live stock exhibits are comparatively unimportant. Endeavor, as far as possible, to give the live stock and other agricultural exhibits the most prominent location in the grounds. In this way you will



A number of agricultural societies have main halls, built on this plan, that have given general satisfaction. There is plenty of table space provided by the tables around the sides and in the centre of the wings. The numerous doors and passages make it possible for the crowd to be kept moving freely. It is possible to group the exhibits in different wings such as fruit and vegetables in one, ladies work and art exhibits in another, etc.

please both the sight-seers and the exhibitors, and at the same time emphasize the agricultural features of the exhibition.

The appearance of the grounds can be greatly improved by the planting of trees. Several societies have planted trees around their horse rings and at central points in the grounds with excellent results. The shade from the trees is always appreciated on warm days by the spectators, and adds much to the appearance of the grounds and buildings. It pays to keep the buildings well painted. Not only do the buildings last longer but the effect on the sight-seers when entering the grounds is more pleasing. A few societies have been able to have their buldings painted free in return for allowing it to be announced on the buildings that they were painted with a certain brand of paint.

Sheep and swine sheds of the Petrolia Society. This illustration serves to show how a few trees add to the appearance of grounds.

When planning to erect buildings always arrange to have them constructed in as permanent a manner as possible. It will be the cheapest course in the end.

THE OWNERSHIP OF LIVE STOCK BY AGRICULTURAL SOCIETIES.

Several societies in Ontario are doing valuable work through the ownership of pure-bred male stock. This was one of the first lines of work undertaken by the pioneer agricultural societies in Ontario. Some of the societies, first organized, sent members to the Eastern States and Great Britain to purchase breeding stock. From that day to this societies in Ontario have owned and circulated pure-bred stock.

Fifty to seventy-five years ago this work was carried on extensively. As the country became settled the increase in the number of private breeders led to this line of work being discontinued by many societies. Of recent years there have been only six or seven societies in Ontario that have owned stock. These societies have obtained excellent results. Buyers of stock who visit the sections where these societies exist report that they are able to purchase more and better stock in those districts than in sections where there are no such societies.

A striking evidence of the benefit of the work done by these societies is furnished by the township of Osgoode Agricultural Society, in Russell county. This society has owned pure-bred stock for many years. For several years a leading agricultural paper in the Ottawa Valley offered prizes for the county agricultural society that had the best exhibit of live stock at its fall fair. Two years out of four the first prize was won by the County of Russell Agricultural Society. The other two years it missed winning first place by only a few points. A large share of the credit for this excellent showing was due to the work that had been done by the township of Osgoode Agricultural Society in that county, through the distribution of pure-bred breeding stock all through the township. Most of the stock shown at the county fair was from this township. It is freely admitted by members of the county society that the county would not have made the showing it did had it not been for the stock that had been bred from the pure-bred animals owned by the township society.

A ram lamb owned by the Osgoode Township Agricultural Society.

There are seven societies in Ontario owning pure-bred stock. These, together with the number of animals they owned in 1905, are as follows:—

The Township of Osgoode Agricultural Society, in Russell county, 3 bulls, 5 rams, and 4 hogs.

The Township of Drummond Agricultural Society, in Lanark county, 2 bulls and 2 hogs.

The Township of Bathurst Agricultural Society, in Lanark county, 1 bull (borrowed), 2 hogs and 2 rams.

The Douro and Dummer Agricultural Society, in Peterboro' county, 8 bulls, and 2 hogs.

The Rochester and Maidstone Agricultural Society, in Essex county, 13 bulls.

Maidstone and Sandwich East Agricultural Society, in Essex county, 7 Shorthorn bulls and 7 hogs.

One reason why this line of work has not been carried on more extensively has been the fact that the basis of the distribution of the Government grant has not taken into consideration the value of the work being done by the societies. Hitherto a society owning one or two animals was likely to obtain as large a Government grant as a society owning a large number. As the expense of keeping the stock increased in proportion to the number maintained, there was no encouragement for the development of this line of work. With a change in the distribution of the Government grant, which will enable these societies to receive their grants in proportion to the number of animals they own, there should be a great increase in the number of these societies, particularly in sections in New Ontario not adapted for the holding of agricultural exhibitions.

This is one of the thirteen pure-bred Shorthorn Bulls owned by the Rochester and Maidstone Agricultural Society in Essex County.

SOCIETIES IN NOVA SCOTIA.

Over 90 per cent. of the societies in Nova Scotia own and circulate pure-bred stock. Very few societies in that Province hold exhibitions. A great deal of work of this kind is carried on also by the societies in New Brunswick and Quebec. The Departments of Agriculture in these provinces report that these societies are doing valuable work. Breeders of live stock, instead of looking upon these societies as competitors, report that they have been a great benefit rather than an injury to them. In explanation they say that many men have become interested in the breeding of pure-bred stock through the agricultural societies who would not have been induced to purchase pure-bred stock for themselves. These men later purchase female stock and breed them to the pure-bred males owned by the societies and thus are able to raise pure-bred animals.

METHODS OF MANAGEMENT.

These societies work in three ways. In Nova Scotia many of the societies purchase pure-bred stock from breeders and auction off the animals in their sections. People buying this stock are required to give a guarantee that they will keep the stock in the section for a stated number of years, and that members of the agricultural society will be allowed to breed to the animals at a certain low price.

Some societies buy the stock and board it at central points in their vicinity. When it becomes desirable to obtain new animals the old ones are sold either to members of the society or to the butcher.

The third method is for the society to purchase the stock and give it to farmers at central localities upon condition that they shall keep the animals free of cost to the society for a certain period. At the end of this time the animal becomes the property of the person so boarding it. Each of these methods has been tried with success. An inspector is generally appointed whose duty it is to see that the animals are kept in a proper manner.

One of the most successful societies in Ontario is the Rochester and Maidstone, in Essex county, which was organized in 1852, with 82 members. This society in 1904 had 184 members and owned 14 pure-bred bulls. The society allows farmers to form themselves into divisions. The members of each division sign an agreement to pay the main society not less than $25 a year for three years. The society the first year gives the division an advance of $80. With this money the bull is bought. Where a division has 15 members the members pay $2 each, which makes $30, that is paid to the head society each year for three years. After the bull is purchased some one of the members agrees to keep the bull for three years for the benefit of the members of the division. Each member of this division is entitled to the service of the bull for three cows. If he has any more cows he gets them served for 50 cents each. At the end of three years the division has repaid to the society the amount advanced for the purchase of the bull.

In the case of the Maidstone and Sandwich East Agricultural Society, in Essex county, 7 bulls and 7 boars are located in 7 different parts of the township, a bull and a boar being kept in each locality. The members of the society in each section pay not less than $2 each and some of them as high as $2.50 as their membership fee, which includes their share in the expense of purchasing and maintaining the stock. Each member is allowed the use of the bull for three of his cows and of the boar for two sows twice a year. The bulls are kept for three years in each locality, after which the animal becomes the property of the keeper, and a new one is obtained. For the keep of a boar the man who has it is allowed $10 a year, and at the end of two years the boar becomes his property.

The Drummond Township Society in Lanark County has owned pure-bred stock every year since 1868. Members are allowed to take two cows to each bull except when the bull is a young animal, when they are limited to one; one sow to each boar, and two ewes to each ram, for the membership fee of $1. The breeding season for the bulls is June and July and they are placed at three central points and changed around every three weeks. The members keeping them receive $2 a week and the privilege of using the bull on their herds. During the remainder of the year the society usually pays $3 a month for the board of the bulls. Ten dollars is usually paid for the keep of a boar for three months. Members who keep the ram, receive, in addition to its fleece, twelve and a half cents a week for the keep of each ewe brought to the ram by a member.

While it is not likely that there will be a material increase in this line of work by the societies in older Ontario it is probable that more of the soieties in newer Ontario will soon commence work on these lines and that their number will show a great increase during the next decade.

A pure-bred Ayrshire bull, owned by the Drummond Agricultural Society, Lanark County, and some of his get.

SPRING STALLION SHOWS.

Spring stallion shows have been held with great success by a large number of the agricultural societies in the province. They generally are held during the latter part of April or the first week of May, and where properly advertised are well attended. The general custom is not to charge any entrance fee, the exhibitions being open to the public. In some cases a slight entrance fee is charged.

A great deal of care has to be exercised in the management of these exhibitions. The owners of the competing stallions often are offended easily and if they feel that they have been unjustly treated they make a great noise, and do their best to injure the standing of the show. No better line of work, however, can be undertaken by any agricultural society. Where the show has once been held and proved a success the farmers of the vicinity are quick to give future shows their hearty support. By affording the farmers an opportunity to compare one stallion with another they are enabled to pick out the best animals. Often a stallion that makes an excellent appearance when shown by itself is found to be a very inferior animal when it is placed in comparison with several others. It is in the opportunity they afford the public of comparing the animals shown that the chief value of spring stallion shows lies.

There are several different ways of conducting these exhibitions. It always is well to advertise them widely. The most successful exhibitions are those where prizes are offered and where the judges, when making the awards, are required to explain their reasons for their decisions. A judge with sufficient tact (and only a judge with great tact should be engaged) is able to point out the strong points of the winning animals, without referring to the weak points of the others. In this way the creation of hard feeling generally is prevented. The judge or some other competent person should give a short address on the principles underlying successful breeding, using the animals present, as far as practicable for illustration purposes.

Spring stallion show held on a rainy day by the Lambton East Agricultural Society.

Another method is to simply advertise that a show will be held at a certain time, and that a veterinary will be present to examine all competing animals. It can be announced that prizes or diplomas will be awarded to every animal pronounced sound by the veterinary. Forthis work it is wise to engage a veterinary from a distance who is unknown to the exhibitors. In this way animals that are not sound are ruled out, much to the benefit of the farmers of the section, many of whom may be unable to detect unsoundness. Breeders who refuse to enter animals under these conditions do so generally because they are afraid their stallions will not pass inspection. The farmers in the vicinity are quick to come to this conclusion.

The Road and Carriage Class at the Tara Spring Horse Fair.

A third method is not to give any prizes, but simply to advertise the show and give the farmers an opportunity to inspect the animals for themselves. The latter method is not satisfactory as either of the former two, but is much better than not holding any show at all. The only expense the society incurred is that of advertising and a few minor incidental expenses. It is well always for the society to arrange to have the animals inspected by a veterinary. Prizes should not be offered for grade or general purpose stallions.

Most societies, when prizes are given, offer cash prizes, although some distribute diplomas, which do not cost much and generally are much more appreciated by the exhibitors as the diplomas are used for advertising purposes. The average agricultural society should be able to hold one of these exhibitions at an expense not exceeding $50.

Tara Spring Horse Fair, 1905. Draught Horse exhibit.

It is a good plan to offer prizes for the best stallion in each class and three or four of his get. By having the young stock on the grounds the spectators are enabled to see the kind of colts the respective stallions are leaving. Much good is accomplished each year by the holding of these exhibitions.

CO-OPERATIVE WORK BY SOCIETIES.

By co-operating in various ways, societies can add many interesting features to their exhibitions. This has been done with great success in the Ottawa Valley. Although there are a number of agricultural societies in Ontario that hold larger exhibitions than any held in the Ottawa Valley, there is no other one portion of the Province which has so many first-class purely agricultural exhibitions. This is due, in a large measure, to the fact that the societies have co-operated for several years in the introduction of special features at their exhibitions. Most of these features have been described in previous reports. They included the holding of athletic competitions for the championships of the respective counties with a final meet to decide the championships of all the counties, and the holding of an annual competition to decide which exhibition in the district was the best.

The first competition was limited to exhibits of live stock only, but later competitions included buildings and grounds. The last competition was held in 1904. The four leading exhibitions were those held at Beachburg, Metcalfe, Renfrew, and Richmond, and the points which they won as published in the *Ottawa Valley Journal* which managed these exhibitions, were as follows:—

STANDING OF THE COUNTIES.

	Possible No.	Beachburg.	Metcalfe.	Renfrew.	Richmond.
Heavy horses	100	90	95	77	75
Light horses	100	90	60	90	50
Beef cattle	100	100	40	45	60
Dairy cattle	100	72	88	74	80
Swine	100	85	65	90	88
Sheep	100	100	87	49	82
Poultry	100	76	100	80	50
Main Building	36	36	20	25	25
Cattle Sheds	24	24	...	16	16
Horse Sheds	24	24	12	12	11
Sheep Sheds	12	12	10	10	10
Swine Sheds	12	12	9	8	10
Poultry House	12	10	12	9	10
Ground size	40	40	40	40	35
Arrangements and Con.	30	30	18	23	18
Neatness	10	10	7	7	6
Total	900	811	663	655	626

By means of the publication of such a table as this each year the societies have been enabled to see how they compared in each of their different departments with others. They thus were enabled to strengthen the weak points of their various exhibitions. This has had much to do with the general improvement of the societies. The competition has tended also to create greater interest in the exhibitions as the local people were led to realize that their exhibitions in a large measure represented their counties, and for this reason they were anxious that their exhibition should be as great a success as possible. The prizes in this competition were awarded upon the decisions of the judges sent out by the Department of Agriculture, who visited the fairs. There are several sections in Ontario where there are local fairs associations in which it should be possible to conduct competitions of this nature.

LIVE STOCK JUDGING CLASSES.

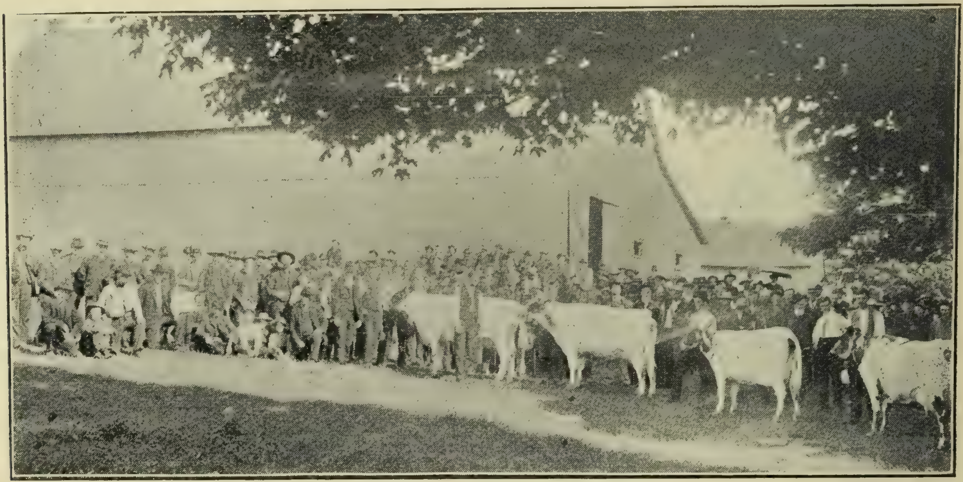
Last year the *Ottawa Valley Journal*, in co-operation with a number of the agricultural societies, offered prizes for judging competitions by farmers sons.

With a view to preparing the young men for the work and furnishing others with some useful and practical information regarding live stock, instruction classes were held during June at the following places:—Cornwall Centre, Lancaster, Vankleek Hill, Maxville, Westboro, Almonte, Vars, Winchester, Renfrew, Beachburg and Newington. The animals for the work were obtained from farmers in the districts where the classes were held. The experts in charge of the work were:—Messrs. H. S. Arkell, of the Ontario

Agricultural College, Guelph and F. M. Logan, Amherst Point, N.S., who were appointed, and their expenses paid, by the Ontario Department of Agriculture.

Great interest was taken in the work by the farmers, and especially the young men, who, realizing the need of instruction and the benefit to be gained, gave it united support. In some cases farmers brought animals several miles to a central point in order to make the class a success. At one place, Maxville, there was an attendance of three hundred and fifty farmers and farmers' sons, and at each of the other places, except Renfrew, the attendance ranged from one hundred to two hundred and fifty.

The work was conducted as follows:—Four or five animals were brought into the ring, and the farmers were asked to place the animals in order of merit and give their reasons for so doing. After all who wished had been given an opportunity to voice their opinions the expert placed the animals and gave his reasons, after which, as a rule, a general discussion took place. Dairy cattle were used in the dairy sections, and beef cattle in the beef sections, and heavy draught horses and bacon swine at all points. The classes were well advertised, and although the work was inaugurated by the *Ottawa Valley Journal*, a number of the local papers in Eastern Ontario willingly helped to push it along.



A Class in Live Stock Judging, held during the summer of 1905 in the Ottawa Valley, preparatory to the Live Stock Judging Competitions for Farmers' Sons, held at the fairs in the fall.

In case other agricultural societies of the Province might like to introduce these competitions at their exhibitions the rules used in the competitions at the fairs in the Ottawa Valley are here published.

THE RULES THAT GOVERNED THE COMPETITION.

1. Competitors must be under 25 years of age; they must be farmers or sons of farmers living in the county in which competition is held.

2. Anyone who has spent more than six months at an Agricultural College shall not be eligible.

3. Competitors will be expected to judge classes of heavy horses, beef cattle, dairy cattle, and bacon pigs.

4. In summing up the following values will be assigned the respective classes:—Heavy horses, 100 points; beef cattle, 100 points; dairy cattle, 200 points; bacon pigs, 100 points.

5. Competitors will be expected to place three animals in each class and give their reasons for placing the one they set first ahead of the ones they place second and third, and for putting the second ahead of the rest of the animals in the class.

6. Competitors will be expected to write their answers upon cards furnished for the purpose.

7. Animals for the judging work will be selected from stock on exhibition.

The live stock judging by farmer's sons held at the Beachburg Illustration Fair, 1905.

8. As far as possible the judging competition will be held before the regular expert judges pass upon the stock. In case any classes to be used in the contest have been already passed upon by the regular expert judges then animals that have not shown against each other or that have not been placed will be used.

The prizes awarded were:—1st prize, $10.00; 2nd prize, $8.00; 3rd prize, $5.00; 4th prize, $4.00; 5th prize, $3.00.

On the day of the competition each competitor was furnished with a card which he was required to fill in with his name and address and on which he had to mark the order in which he placed the three animals. A blank space was left on each card in which the competitor was required to write his reasons for placing the animals in the order he did. These cards later were handed to the judges.

NOTES ON THE WORK OF AGRICULTURAL SOCIETIES.

Every year agricultural societies in different parts of Ontario introduce special features at their exhibitions, many of which might be tried with profit by other societies. A report concerning some of these features should be of interest to societies generally.

Last year the agricultural society at North Bay, which is located in rather a sparsely settled section, instead of offering small prizes in many sections, reduced the number of its classes and offered larger prizes in each. The result proved very satisfactory, as it led to a keener competition and brought out the very best exhibits the section could produce Previously, some people had refused to exhibit owing to the smallness of the prizes.

Another line of work undertaken by the same society was the holding of a Good Farms Competition, on somewhat the same lines as those held each year in the province of Quebec. In a letter to the Department of Agriculture, Mr. A. G. Browning, the President of the society, had the following to say about this work:—"For some years I have been watching the work of the agricultural society here, having been its first president, and being connected with it from the beginning. I became convinced that while the society was probably doing good work along the lines of providing holiday amusement for the general public and distributing a little money, not much good was being done. The breed of cattle was not being improved, the prizes for fancy work and articles of this kind did not encourage the farmer, but were apt to go to the people of the towns, who exhibited the same articles year after year, or purchased them from someone else. In the roots and vegetables department the genuine farmer did not stand any chance at all as the market gardeners came in and took all the prizes. Very often it was the case that the poorest farmer in the locality happened to have the biggest pumpkin or squash, and all around the money seemed to be wasted and nothing done to arouse interest in good farming.

"While I feel somewhat strongly on the subject and am perhaps inclined to judge too harshly, I would not desire to go on record as stating that no good was done by the society. At the same time the results were not at all commensurate to the work done or the money spent. A number of us happened to be thinking along the same lines, and at our annual meeting we decided to either drop the society work altogether, or to start out on new lines. After considerable discussion and consideration it was decided to confine our efforts for a few years to cattle and horses and pay particular attention to the encouragement of those who were trying to improve their farms. It seemed to us with the funds at our disposal, only a limited number of prizes could be offered of an amount worth while and if you will refer to our prize list of last year you will see it is a very short one but the prizes offered were fairly large.

In the good farms competition the prizes offered were $15, $10 and $5 for the best three farms. In our advertisement we stated that particular attention would be paid to the fences, state of clearing, cultivation of the ground, farm buildings and quality of the stock. The judges were instructed not to lay any stress upon the number of acres, but upon the way in which the land under cultivation was worked. Our idea was that a small farm well worked was more to be desired than a large farm not properly attended to.

"The competition was advertised early in the spring through the papers and at our spring sale of stock. It was kept prominently before the public during the summer, and when the full prize list was gotten out public notice was given to the farm competition. We left the matter of points to the judges, and they will be able to tell you how the decision was arrived at. A considerable number of farmers entered the competition and great interest was taken in it. The result was, in our opinion, very successful, and we intend to lay more stress on the competition this year, giving, if possible, two or three sets of prizes, along the lines of farm buildings, quality of stock, and general condition of the farm land. My conviction is that money expended in this way is spent to very good advantage."

Mr. G. H. Hutton, of Easton's Corners, one of the judges sent out by the Department of Agriculture, who, together with Mr. James Snell, of Clinton, judged the farms entered in this competition, has the following to say in regard to the competition:

"There were seven farms entered and judged in the good farms competition held by the society at North Bay. The entries were limited to the township. I believe there was considerable interest taken by the competitors, there being only one farm which did not give evidence of preparation for the event. I believe that a continuation of this line of work from year to year would stimulate great interest, rivalry, and consequent improvement. Upon one farm there was evidence of thorough work, by way of preparation, which would result in cash returns to the owner greater than the value of all the awards. I believe that six-sevenths of the competitors did improve their places, and that for them the society did good work last year.

"Such a line of work strikes the all round management of farms and affects the cash returns of all concerned and deserves encouragement, not only in the northern part of this Province but it would be worth trying in older Ontario. We used the following scale of points and asked each man a certain list of questions regarding each item in the scale:

	Possible score.	Points allowed.	Comments.
1. Cultivation	80	...	...
2. Live Stock	60	...	...
3. Buildings	30	...	...
4. Fencing	25	...	...
5. Orchard and Garden	10	...	...
	200		

SAMPLE OF PRIZE LISTS FOR SCHOOL CHILDREN'S COMPETITIONS.

Many societies that would like to start holding school children's competitions at their fairs do not know how to set to work. For their guidance the following extracts from the prize lists of the Central Exhibition at Guelph and of the Norfolk Union Fair at Simcoe are published.

CLASS 95. WRITING AND DRAWING, NATURE STUDY AND MANUAL TRAINING.

High Schools, Collegiate Institutes and Private Schools not allowed to compete.

Rules—read them carefully.

All work must be done by the pupil, not by the teacher, and all be done since the last exhibition, and pupils must help to arrange the exhibits in the Nature Study Department.

One prize only allowed a pupil in each section.

Entries must be made by the teacher for all the entrants from his or her school room on one entry form.

The name of the pupil, the number of the school section, and the name of the township or other description must be plainly written on the book, etc., and in the entry form.

At least one-half of work in drawing books should be completed. 50 per cent. of marks for optional work.

In drawing classes, pupils may continue any further work they may desire up to the time of the exhibition, and their work will be judged in the class to which they belonged before the holidays.

Teachers not finding it convenient to be present may forward the work to the secretary, who will return it at close of exhibition, and it must, if sent by mail, be received not later than noon on Monday, September 11th.

Sec.		1st	2nd	3rd
1	Best drawing for 2nd Class, No. 2 drawing book...	$1 00	$0 75	$0 50
2	Best drawing, for 3rd Class, No. 3 drawing book...	1 00	75	50
3	Best drawing, for 4th Class, No. 4 drawing book...	1 00	75	50
4	Best specimen of pencil drawing, original, open to all classes in Public Schools	1 00	75	50
5	Best pen and ink sketch, original, open to all classes in Public Schools..........................	1 00	75	50
6	Best specimen writing, any style, legibility, neatness and uniformity to be considered, 2nd Class, on foolscap or similar paper. Text—First two verses of "Will and the Bee," Second Reader, and the alphabet in capitals and small letters, and the figures	1 00	75	50
7	Ditto for 3rd Class. Text—First two verses of "Lord Ullin's Daughter," Third Reader, and the alphabet in capitals and small letters and the figures. 1st by C. L. Nelles, cash...	1 00	75	50
8	Ditto for 4th Class. Text—First two verses of "A Psalm of Life," Fourth Reader, and a Bill of six items of goods purchased from G. B. Ryan & Co., Guelph, Sept. 13, 1904, and receipted Oct. 1. 1st by Miss C. Anderson, cash	1 00	75	50
9	Ditto for 5th Class. Write an "Application for Situation as Book-keeper," in G. B. Morris & Co.'s Hardware Store, Guelph. Draw envelope and address it. Pupils in the Commercial Class Guelph Public Schools barred	1 00	75	50
10	Ditto for 5th Class. Same as Section 9. Open to all Schools	1 00	75	50
11	Best specimen Ornamental Engrossing, open to all classes—The Lord's Prayer	1 00	75	50

NATURE STUDY.

The South Wellington Farmers' Institute have kindly contributed $25 towards the prizes in this class.

1—These prizes are offered to encourage nature study in the Public and Separate Schools. The teacher must certify that the collections have been made in connection with the school by the co-operation of the pupils, or by an individual pupil, and must have been done since last Exhibition.

2—The prizes in each class are $2.50, $2.00, $1.50, $1.00 and 50c.

3—Each exhibit must show plainly the name and place of the school, and the name of the teacher.

4—Entries close September 9th, and all exhibits must be in position by 12 o'clock, September 12th. No fee is charged in any class under this heading.

5—The preparation of exhibits should be as nearly as possible according to directions given in the "Hints on Nature Collections," a bulletin prepared by the Macdonald Institute.

Prize List.

12—Collection of Wild Plants and Flowers, picked and pressed, while in bloom, showing root and mounted, and correctly named.

13—Collection of Noxious Weeds, pressed and mounted.

In Sections 12 and 13, pupils from any school may compete individually for these prizes, and use their exhibits collectively for a sectional exhibit, the prizes being duplicated for this purpose. Pupils of Macdonald Consolidated School barred in Sections 12 and 13. See Sections 14 and 15.

14—Same as Section 12; open to all schools.

15—Same as Section 12; open to all schools.

16—Collections of seeds of noxious weeds, in glass vials, mounted on cards—vials not necessarily full.

17—Collection of grains in the head, 5 heads of each variety, stems about 12 inches in length, supported on cards.

18—Collection of grasses and clovers; 5 stems of each as in Section 17.

19—Collection of leaves or twigs of cultivated or forest trees.

20—Collection of native woods, showing bark and surfaces. Each specimen not to be more than 5 inches in length.

21—Collection of insects, injurious or beneficial.

22—Collection of noxious weeds, newly pulled, each bearing a label or tag with name and locality. Specimens should show the complete plant, with flowers and fruit, if possible, but care must be taken not to scatter seeds by means of any of these exhibits.

23—Bouquet of cut flowers grown on school grounds or in school house.

24—Drawing of a plant, bird and insect, grouped if possible by the pupil of the school.

25—Photographs of natural scenery, by a pupil of the school.

26—Naming competitions, open to individual pupils of the public or separate schools. This will include the naming and discussion of several varieties of apples, grains, weeds, wild flowers, birds or other common outdoor objects, $3, $2.50, $2, $1.50, $1 and 50 cents.

27—A collection of nature notes kept in the school by the teacher and pupils, and showing interesting events from day to day in the outdoor world. Such may include the arrival, nesting, and food of birds, the opening of flowers, the appearance of insects, the leafing of trees, the sowing or planting of crops, the blossoming of fruit trees, the occurrence of storms or floods, and any similar items of interest. These should be written, as far as possible, by the pupils themselves, under the teacher's guidance, and should give date, place and all necessary details over the signature of the observer.

A neat scribbling book, written in pencil, will be satisfactory for this purpose. It will be judged for neatness, completeness and accuracy. This would require only a few minutes at a set time each day, say the first thing in the morning, and would be a splendid exercise in training the observation.

28—To the teacher and pupils of a public school section making the best and best arranged exhibit of roots, vegetables and grain, $5, $3 and $2.

NORFOLK UNION FAIR.

The following is taken from the programme of the Norfolk Union Fair:

On the grounds at 2 p.m., the following programme of school competitions will be carried out:

1—Best rural school section display, not less than 10 pupils, in conveyance drawn by four horses.

1st Prize	$15 00
2nd "	10 00

Wand Drill by School Children at Chesley Fair.

2—For rural school section of one teacher. Best drilled and marching squad of 12 or more pupils and teacher.

1st Prize	$8 00
2nd "	6 00

3—For rural school section of two teachers. Best drilled and marching squad of 16 or more pupils, accompanied by both teachers.

1st prize	$10 00
2nd "	8 00

4—For school in towns and incorporated villages. Best drilled and marching squad of 20 or more pupils under command of teacher.

1st prize	$10 00
2nd "	8 00

5—Best class in club swinging of not less than 10:

1st prize	$3 00
2nd "	2 00

6—Best class in wrist exercises of not less than 10:

1st prize	$3 00
2nd "	2 00

7—Boys' race, under 16, 100 yards:

1st prize	$1 00
2nd "	50
3rd "	25

8—Boys' race, under 13, 75 yards:

1st prize	$1 00
2nd "	50
3rd "	25

9—Boys' race, under 10, 50 yards:

1st prize	$1 00
2nd "	50
3rd "	25

10—Boys under 16, kicking football:

1st prize	$1 00
2nd "	50
3rd "	25

11—Boys under 16, throwing baseball:

1st prize	$1 00
2nd "	50
3rd "	25

12—Boys under 16, three-legged race:

1st prize	$1 00
2nd "	50
3rd "	25

13—Girls' race, under 14, 75 yards:

1st prize	$1 00
2nd "	50
3rd "	25

14—Girls' race, under 10, 50 yards:

1st prize	$1 00
2nd "	50
3rd "	25

15—Girls' race, under 8, 40 yards:

1st prize	$1 00
2nd "	50
3rd "	25

Tug-of-war—For teams of six public school boys, 14 years and under; each team to represent a minor municipality in the county—prize 6 sweaters.

Entrance for competition, free.

Teachers must accompany their own scholars in procession.

Schools must be drilled when on the grounds by their own teacher or teachers or one of the pupils.

The same school may compete in section 1, and also sections 2 or 3.

For No. 2, two adjacent rural school sections, with average attendances of 30 or less, may combine.

All schools competing will meet at high school grounds, Simcoe, at 1 p.m., form in procession at 1.30 p.m. sharp, and march with the band to the fair grounds, where the programme will be carried out.

Teachers and pupils competing and in procession will be admitted to grounds free.

All school children in the county will be admitted to the grounds free on the afternoon of the 18th, but the teachers from each school must procure tickets for their scholars from the secretary previous to the fair.

Ages of children competing in races must be certified to by their teacher.

In sections 1 to 6 the prize money shall be paid to the teacher who shall divide it among the children who have helped in making the exhibit, or for the establishment of a library or any other beneficial object in connection with the school.

In sections 7 to 15, the prizes will be books or other articles to the value named.

Programme and procession under charge of R. W. McCall, H. B. Donly, W. S. Carpenter,, A. H. Smith, S. C. Kitchen and H. F. Cook, B.A.

NATURE STUDY.

In order to encourage the observation of natural phenomena among the pupils of our schools, the directors of the Norfolk Union Agricultural Society have pleasure in offering the following prizes for competition. It is the intention of the directors to encourage this study of nature as one of the educational features of their exhibition and would ask for kindly co-operation of teachers, parents and scholars.

1—These prizes are for competition either by individual pupils or by any number of pupils co-operating, but any number of individual pupils or groups of pupils may compete for the same prize, and are open only to the schools of Norfolk County.

2—A card with the name of the exhibitor, the number of the school, and the name of the township or location must be securely fastened to each exhibit.

3—Each plant shown in sections 1 and 2 shall be separately tied to admit of individual inspection. The plant of each variety shall be neatly bound together and labelled.

4—All the work in connection with each of the exhibits must have been done by the pupils under the direction of the teacher and with his or her assistance or supervision.

5—All entries must be made by the teacher on behalf of the pupils, certifying to their correctness. No entry fee in this class. All exhibits must be on the grounds and in position by 12 o'clock on Tuesday, October 17th.

6—The prize money shall be paid to the teacher, who shall divide it among the children who have helped in making the exhibit, or for the establishment of a library or any beneficial purpose in connection with the school.

PRIZES FOR COLLECTION OF GRAIN, INSECTS, ETC.

1—For the best and best arranged exhibit of grain in the straw, the growth of the current year, showing stools, branches, and part of roots, consisting of six complete plants of each variety, with also a pint bottle of each sample of said variety of grain.

1st prize	$5 00
2nd "	3 00
3rd "	2 00

2—For the best and best arranged exhibit of clovers and grasses, the growth of the current year, showing all branches and part of root of each plant. This exhibit to consist of at least six plants of each variety shown—at least six varieties must be shown in each exhibit in this section.

1st prize	$5 00
2nd "	3 00
3rd "	2 00

3—for the best and best arranged exhibit of roots, fruits and vegetables:

1st prize	$5 00
2nd "	3 00
3rd "	2 00

4—For the best and best arranged collection of beneficial and injurious insects, mounted and properly labelled, and arranged in groups:

1st prize	$5 00
2nd "	3 00
3rd "	2 00

Apple Naming Competition.

A number of varieties of apples will be mixed together. The contestants will then, in the presence of the judges, pick out the apples, naming the variety of each, and the quality. Seventy per cent. for correct naming and thirty per cent. for quality. Open to boys or girls of Norfolk County from ten to sixteen years of age. Judging to take place on Wednesday, October 18th, at 1.30 p.m. Entrance free.

1st prize	$2 00
2nd "	1 50
3rd "	1 00

ODDS AND ENDS.

Baby shows have been held with success by a number of societies. The custom is to offer prizes to every woman who exhibits a baby. This has the effect of leading many women to bring their babies to the exhibition, and to give those present an opportunity of comparing the little ones. Where these baby shows have been properly advertised they generally have created a great deal of interest. Special prizs can be offered for twins, the fattest baby, the tallest baby for its age, etc.

The secretaries of many agricultural societies are editors of papers. This is the case with the South Renfrew society, the secretary of which is Mr. W. E. Smallfield, of Renfrew. For several years Mr. Smallfield has published a "Fairs Bulletin" before the annual exhibition. The bulletin describes at length the special features that will be introduced in connection with the exhibition during the year, contains photographs of any new buildings, the leading officers and exhibitors, a list of the special prizes and the people who have given them and other information of this nature. Mr. Smallfield has succeeded in obtaining sufficient special advertisements for this bulletin to defray a considerable portion of the cost. The bulletin has been the means of creating a greater interest in the exhibition and of advertising it. This is a suggestion for other editors.

A few societies have held Old Boys' Reunions at their fairs with great success. They arrange committees composed of influential people in the neighborhood who correspond with the relatives of local residents who have moved away. Invitations are sent to these people to return at the time of exhibition. The town council joins in the issuing of these invitations and in the arranging for the reception of the "Old Boys." These reunions tend to create a greater interest in the fair and to strengthen one of the best features of every exhibition—its social side.

The Department of Agriculture frequently receives letters from directors of societies asking what are the powers of the honorary directors. It is asked if they are eligible to be placed on committees, and if they have votes. on questions relating to the management of the society. This question is asked so often it is well that the duties of honorary directors should be thoroughly understood. Honorary directors have no right to vote at meetings of the members or directors. The directors are elected by the members of the society to conduct the business of the society and the responsibility of such work rests with them. Honorary directors may tender their advice, and may even sit on committees, but have not the power to vote.

THE WORK OF ONE SOCIETY.

Secretary W. H. Kerr, of the East Huron Agricultural Society, whose fall fair is held at Brussels, has furnished the following information in regard to the work of his society. This society for years has been endeavoring to present features of an educative character, and at the same time of sufficient interest to prove attractive to sightseers. It has given prizes for the past eight or ten years for field root competitions in which half acre plots of mangels and turnips are judged on the farms of competitors, with prizes for each of $2.50, $1.50 and $1.00. Poultry demonstrations and lectures have been given by Mr. F. C. Elford, now of Ste. Anne de Belleview.

Apple naming by children under sixteen years has been a feature for a number of years, the competitors naming the fruit on the first afternoon of the fair under the direction of the judge. Boys have designated twenty varieties correctly.

Last year judging of thoroughbred young cattle by boys was added. The various points were marked on a card by each boy and afterward submitted to the judge who criticised their work and awarded the prizes. There were twelve competitors and ten of them selected three of the animals wining the tickets given by the expert judges. It was a matter of no small interest on the afternoon's programme. Foot races for children have been held with no lack of entries. Club swinging exercises have succeeded and last year the society offered three awards for the best fancy drill presented by sixteen school pupils. Ethel Public School carried off the honors with twenty-five scholars, and the drill was the prettiest feature of the day. It was enthusiastically cheered by the immense crowd. It was given on the track in front of the grand stand, to the accompaniment of a brass band. Teachers and pupils were admitted free to the park and in addition to a prize of $5.00, were generously treated by their admirers. The drill was splendidly done. "We are more convinced than ever of the beneficial results of this class of attractions," writes secretary Kerr, "as compared with "midway" presentations. This year we hope to enlarge and improve on our very satisfactory experience of 1905. The first evening of the fair we have had children take part in vocal and instrumental music and recitation. We always have a big concert on the evening of the second day."

STANDING CROP COMPETITIONS.

Excellent work can be done by societies through offering prizes for the best standing crops of grain and vegetables. Competitions of this kind necessitate the incurring of more expense for the judging than is the case when prizes are offered simply for exhibits of grain and vegetables at the fall fair, but they are invariably productive of more good. It not infrequently happens that the people who win prizes at agricultural exhibitions on exhibits of grain and vegetables are able to do so because their exhibits are not really representative of their full crops. For this reason prizes offered for the crops as they stand in the field reach the persons best entitled to receive them. To ensure the grain and vegetable department at the fair not being neglected some societies insist that the winning competitors in the standing crop competitions shall make an exhibit of a specified size at the fall exhibition before they will be entitled to receive their prizes.

In the conducting of apple naming competitions for boys it is customary for the directors in charge to select two apples of as many varieties as may be deemed advisable and to mix these apples in a heap. The competitors, later, are brought, one by one, and asked to sort these apples out placing them in pairs correctly. Often the competitors are required to give some information in regard to the characteristics of each variety. The competitors picking out the largest number of apples correctly and giving the most information concerning them win the prizes.

A school children's competition that has not been tried at many exhibitions in Ontario, but which is easily arranged and a strong drawing card, is to offer prizes for the class of children singing the best in front of the grand stand. It is customary to have one song which each class must sing and to allow the classes to select and sing one song of their own. This feature is improved sometimes by requiring the classes of children to drive to the grounds in decorated waggons. The waggons containing the children drive on the track in front of the grand stand, where the singing takes place. A nice prize for the victors is a framed photograph of the competitors, which can be hung in the school room.

A number of societies make considerable money each year by holding a concert the evening of the first day of their fair. The concert need not be held on the exhibition grounds, frequently a hall in the town or village is utilized. When one successful concert has been held it is an easy matter to make similar events a profitable source of revenue annually for the society.

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